School-based Disaster Risk Reduction Approach in Building Resilience of Primary Education System in Central Vietnam

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TONG THI MY THI

School-based Disaster Risk Reduction Approach in Building Resilience of Primary Education System in Central Vietnam

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TONG THI MY THI

International Environmental and Disaster Management Laboratory
Graduate School of Global Environmental Studies
Kyoto University, Japan

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ABBREVIATIONS AND ACRONYMS

CCE	Climate Change Education
CSFC	Committee for Flood and Strom Control
DRR	Disaster Risk Reduction
DRRE	Disaster Risk Reduction Education
DoET	Department of Education and Training
EE	Environmental Education
GFDRR	Global Facility for Disaster Reduction and Recovery
IPCC	International Panel on Climate Change
JICA	Japan International Cooperation Agency
LE	Local Education
LSE	Life Skill Education
MARD	Ministry of Agriculture and Rural Development
MoC	Ministry of Construction
MoET	Ministry of Education and Training
MoLISA	Ministry of Labor, Invalids and Social Affairs
MoNRE	Ministry of Natural Resources and Environment
MPI	Ministry of Planning and Investment
NAP	National Action Program
NGOs	Nongovernmental Organizations
NTP	National Target Program
SRV	Socialist Republic of Vietnam
UN	United Nations
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
UNISDR	United Nations International Strategy for Disaster Reduction
VND	Vietnamese Dong
VNRC	Vietnam Red Cross
WB	World Bank

EXECUTIVE SUMMARY

Background of the thesis

Extensive damages caused by natural disasters are being reported daily all over the world, especially in developing countries where people live in poverty, lack of infrastructure, lack of education, and limited access to technologies. The level of damages by disasters is highly dependent on the level of preparedness of local and national bodies, as well as on the capacity of communities and individuals to manage the hazard. Inappropriate structural measures, lack of planning for disaster risk reduction, unawared about disaster risks, and lack of cooperations among different stakeholders will contribute to largely increasing of disaser devastation. Thus raising people awareness on risks, providing them the systematic knowledge on disaster risk reduction, and building their capacity to be resilient to disasters are of tremendous importance. In this context, disaster risk redcution education comprising both education governance and educational activities, which origins from school and spearheads effects to community, is essential for reducing risk and building resilience to disasters.

In the context of increasing damages from disasters, the highly recognition on importance of disaster preparedness and response, as well as the vital role of school and school education for disaster risk reduction, this research is an attempt to contribute toward efforts on reducing risk and building resilient capacity in the education sector. It tries to find out appropriate approach for facilitating disaster risk reduction education from school level. The target of the study is primary education system in Central Vienam, one of the regions most impacted by natural disaster in Vietnam.

In order to investigate the implementation of disaster risk reduction education in practice, this research concentrates on advancing two key important aspects of educational resilence including educational governance and educational activities. Educational governance includes activies related to educational management, policies,

guidance, processes and decision-making on the implmentation of disaster risk reduction. Meanwhile, educational activities mentions to all teaching and learning activities inside or outside of school, which target school students. On this basis, comprehensive understanding of disaster risk reduction education will be considered to provide a strategic approach for building resilience of the primary education system in Central Vietnam. The ultimate purpose of the study is to maximize effectiveness of educational governance and educational activities in a way that help to strengthen educational resilience to natural disasters.

Research objectives and questions

While it is widely recognized the important role of school and school-based education for disaster risk reduction, a comprehensive approach that takes into account various aspects from school structural and non-structural safety, external relationship between school and community, teacher training, and integration of disaster risk reduction has not been paid sufficient attention. This research seeks to develop an innovative approach on disaster risk reduction education, which encompasses far more than educational activities in school and also considers educational governance on disaster risk reduction.

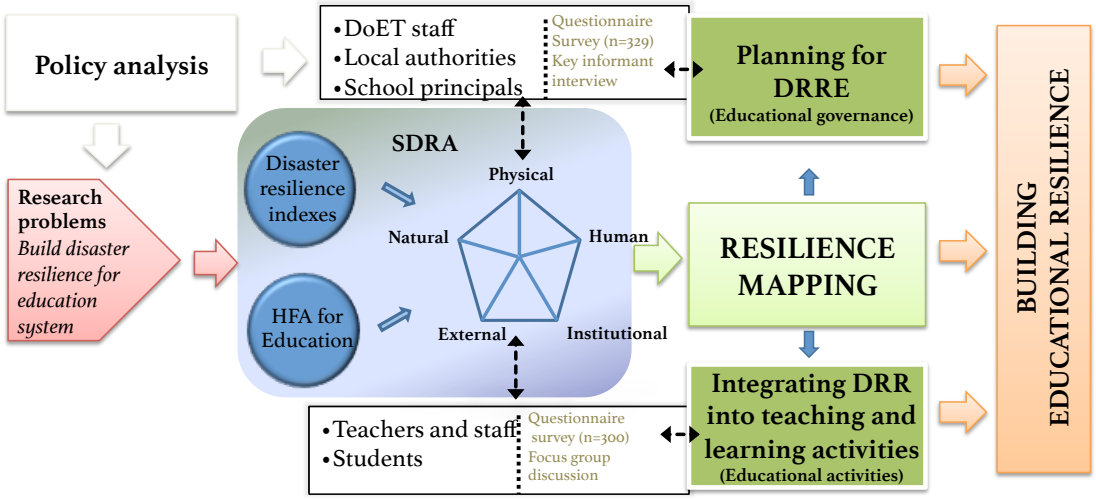

Figure E.1 Research framework

The study targets primary education in Central Vietnam to investigate the level of school resilient to disasters and advance understanding on the implementation of disaster risk reduction education from school level. The specific objectives are as the following:

- To assess resilient level of primary schools looking into different aspects of disaster risk reduction education;

- To examine disaster risk reduction education planning using school-based approach with involvement of various stakeholders, including formulation of a model for integration of disaster risk reduction into teaching and learning activities;

- To develop a strategic framework and step-wise process for the implementation of school-based disaster risk reduction education toward building resilience for primary education system

To tackle the objectives as mentioned above, the study quests for answers of the following questions:

- What are the key factors of educational disaster resilience and in what way schools can be assessed in a certain level of resilience to climate-related disasters?

- How to plan for disaster risk reduction education, as well as to integrate disaster risk reduction into teaching and learning activities?

- How to operate school disaster risk reduction education in a way that helps to enhance resilience for the primary education system?

Key findings of the research

The research is an attempt to develop an assessment tool for measuring resilient capacity of schools, named School Disaster Resilience Assessment (SDRA). The analysis shows variations among the implementation of disaster risk reduction education, which resulted in different resilient level between regions. This has important implications on the need for case specific approaches in addressing disaster risk reduction education differently base on the local context. The case study of rural schools in Da Nang City highlights the highest resilience of physical conditions, human resources, institutional

issues and external relationships, whereas lowest in natural conditions. This proves that educational resilience can be built based on the improvement of school capacity on physical conditions, human resources, institutional issues and external relationships. Analysis the strategies of rural schools in Da Nang City has illustrated a focus on some key aspects of different aspects. For example, to improve human resources, the foci are on enhance teacher capacity through teacher training; for institutional issues, integration of disaster risk reduction into school curriculum, development of disaster risk reduction materials and set up earlier warning system in schools are highlighted; to improve external relationships, the schools has established a strong relationship between school and community, simultaneously strengthened schools' capability to be used as evacuation for community. As a result, despite the limited financial supports from outsources and severe impacts of disasters such as typhoons, salinity, and heat waves, the rural schools in Da Nang City show the highest level of resilience to disasters among regions. The results from the two-year analysis (2011-2013) of SDRA in urban schools in Hue City also stressed on the highest and also the most important contribution of Human resources and Institutional issues. Training for teachers, students, as well as involvement of parents in disaster risk reduction activities need to be enhanced through development of school strategies but also through teaching and learning activities in schools. Compare to the quickly change of human resource, particular teachers' factor, the external relationships are difficult to be improved, thus focus on reinforcement of external relationships are also crucial for the increase of educational resilience. There is a need for a strategy to manage the relationship between school and community, to prevent the downward trend of this factor in the face of urbanization and development.

Based on the result from resilience assessment, the process to formulate action plan for the implementation of disaster risk reduction education was examined. At first, 51 educational disaster resilience actions were proposed base on the framework of SDRA through focus group discussions with participation of DoET staff, school principals and school teachers. Then stakeholder analysis was carried out to understand different role of stakeholders in the implementation of disaster risk reduction education in school. Results show that the leading role of teachers was identified for most of the actions. DoET staff and local government were considered as the two most important supporters for the

practice of disaster risk reduction education. Simultaneously, time schedule for completing each action was defined using the scale of short term (2 years), medium term (from 2 to 5 years) and long term (more than 5 years). There are 42 actions in Hue Province and 49 out of the total of 51 actions expect to be accomplished within the period of 2 years (short-term). Prioritizing the top 20 actions that need for facilitate disaster risk reduction education shows that both in Hue Province and Da Nang City, actions aiming to improve Human resources and Institutional issues are strongly focused. This finding was again confirmed when studied about the implementing mechanism for these 20 actions in specific schools, especially in rural school of Da Nang City. For examples, rural school in Da Nang City (Hoa Khuong primary school) has set up the regular check for school buildings by cooperating with local government, local DoET, experts, NGOs, and local community. The school has given a very strong suggestion to these stakeholders that their roles on disaster risk reduction education should be included into their annual action plan. In general, it can be assumed from the interview of rural school in Da Nang City that the school strategies on disaster risk reduction education focus on encouraging the leading role of teachers and students whenever relevant, as well as the involvement of parents and cooperation with other organizations.

Furthermore, results from the investigation on experiences and needs of teachers in teaching and learning disaster risk reduction in school show that the majority of teachers experienced teaching disaster risk reduction education, in particular in the subjects of Vietnamese, Ethics, Science and Nature (for grade 1, 2, and 3) and Vietnamese, Geography and History (for grade 4 and 5). This creates an opportunity for the textbook-driven approach to be applied in the context of Vietnam, especially in the beginning phase of disaster risk reduction education. Results from reviewing the textbooks of all subjects of the primary level illustrate that the disaster risk reduction related issues exist in the current curriculum, yet insufficient for students to perform actions. The most challenge for teaching disaster risk reduction education is that since the curriculum in Vietnam is centrally controlled, the localization, which is crucial for learning disaster risk reduction education, is still neglected. Local education, life skill education and extra-curricular activities were found as potential addresses to resolve the problems. While local education provides students chance to understand about natural disasters in the local

context, life skill education equips students with necessary skill to response to disaster and reducing damages. However, there is an obstacle that life skill education is still under national control and local education are provincially control whereby the content is not yet enough to satisfy the variation of students' characters, teachers' ability, schools' strategies, or of local socio-cultural conditions, in particular specific educational context. For example, there are different types of disasters associated by different topography and weather in Hue Province, yet the content of local education are generalized for mountainous, coastal and plain alike in the province. At the end, the chapter proposed that a focus on extra-curricular activities, which are decided by schools, is important to overcome existing bottlenecks, also contribute to strengthen the relationship between school and community.

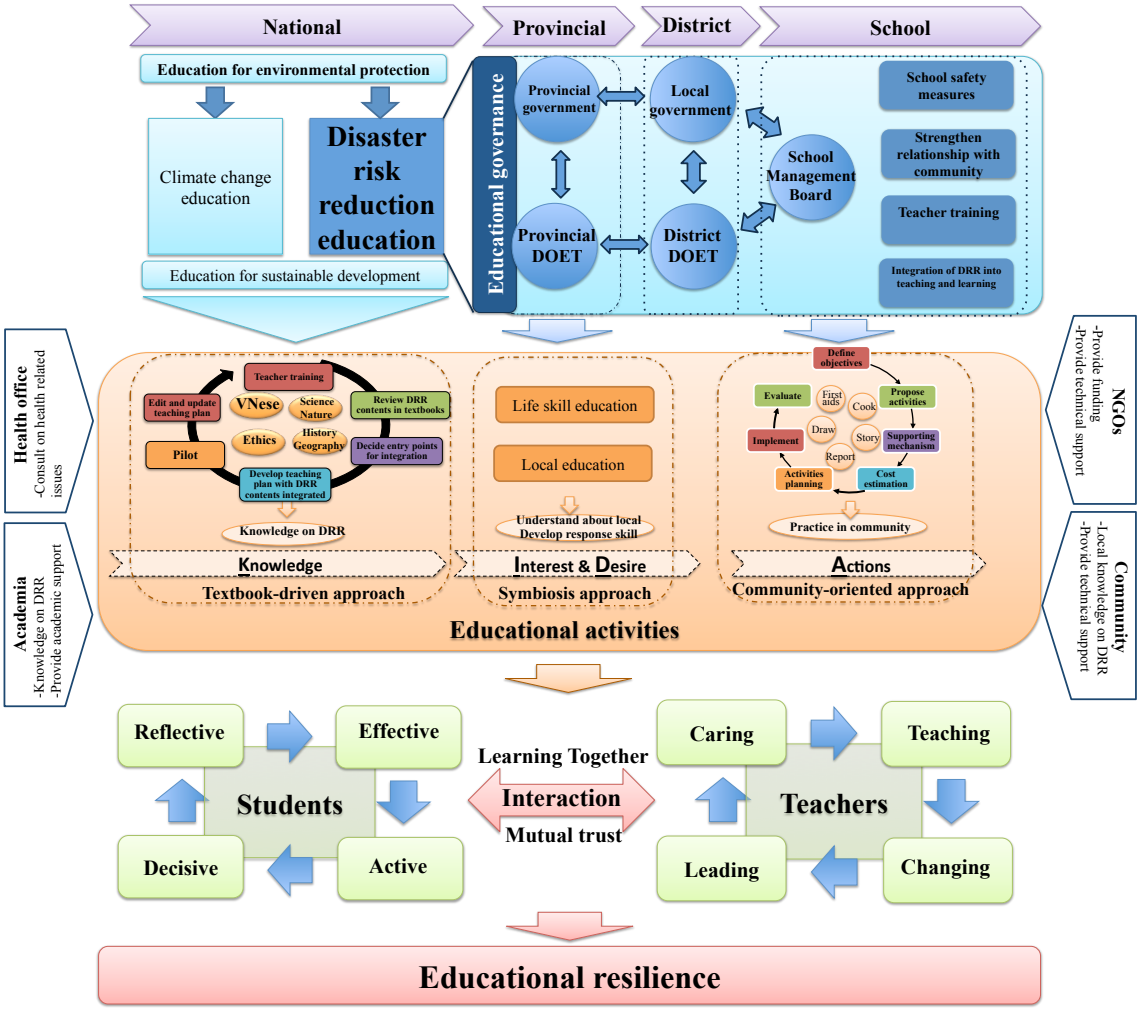

Figure E.2 Framework to promote school-based DRRE

From the key findings of school resilience assessment and teachers' assessment in Central Vietnam, the study proposes framework to promote disaster risk reduction education should include different activities and approaches in facilitating governance and educational activities. The framework was built up on the concept of educational resilience, school safety, "Knowledge-Interest-Desire-Action" (KIDA) model, and different approaches including textbook driven approach, symbiosis approach, and community-oriented approach. The involvement of various stakeholders from school teachers and students, educational staff, local government, local community, NGOs, Health Center, and other organizations are emphasized. As the two identified components of the framework are led by school teachers and students, a school-based approach is crucial for the implementation of disaster risk reduction education. The main objective of the school-based disaster risk reduction education is to optimize the use of both internal and external school resources in effective way to minimize and reduce negative impacts of natural disasters, and contribute to the enhanced resilience for the education sector and for the community as a whole.

5 Way forward

Although education is very much rooted in the local context, there are still basic principles of education, which are universal and can be applied to different regions. Accordingly, the set of resilience indicators, the process of school-based planning for disaster risk reduction education, as well as the process of integration of disaster risk reduction education into teaching and learning activities in this study although developed along with the specific conditions of Central Vietnam can be repeated by modifying and making it compatible with other regions, particularly for the cities or provinces located along coastal line.

Findings and limitations of the research have given a lot of spaces for further exploration about disaster risk reduction education, either supplement or fulfill the research results or elaborate more about different aspects of this study. For example, study on the mechanism to bridge the policy gap from national to local level is needed. Of which, scaling up school-based advocacy and developing linkages between local and

national level can be considered as one potential way. Another focus for future research is to investigate the impacts of local economic development to the level of educational resilience. In one way, economic growth is one of the important factors for the improvement of resilience. In other hand, economic development will cost people's time and efforts, thus limit their involvement in public activities. Study on the advantages and disadvantages of economic growth on educational resilience will therefore of extreme importance. Besides, study on incorporation of developmental issues such as gender, health, food security, etc. in order to bring together disaster risk reduction education with different types of educations such as climate change education, educational for all and education for sustainable development is required for a sustained resilience. The issues on how to define and monitor the effectiveness and efficiency of the implementation of disaster risk reduction education and building resilience for the education sector are also needed. Attention can also be paid on the application of school-based disaster risk reduction education at regional level, whereby establishment of regional focal point for schools located in different geographical and socio-economic conditions.

Chapter 1 Introduction

This chapter provides an introduction of research background, objectives and methodology being used in the thesis. Background information draws upon profile of climate-related disaster and its impacts on education sector to demonstrate the needs of disaster risk reduction education and essential roles of school in disaster preparedness and response. This study targets primary schools in Thua Thien Hue Province and Da Nang City in Central Vietnam. Location of study sites will be briefly described including basic information on natural condition and socio-economic development context. The ultimate goals of the research to build educational resilience employed different methods will be presented. Finally, it outlines the structure of the thesis with brief description of each chapter as well as connections between different chapters.

Contents

INTRODUCTION

1.1 Research background

Extensive damages caused by natural disasters are being reported daily all over the world, especially in developing countries where people live in poverty, lack of infrastructure, lack of education, and limited access to technologies. The level of damages by disasters is highly dependent on the level of preparedness of local and national bodies, as well as on the capacity of communities and individuals to manage the hazard. Inappropriate structural measures, lack of planning for disaster risk reduction, unawared about disaster risks, and lack of cooperations among different stakeholders will contribute to largely increasing of disaser devastation. Thus raising people awareness on risks, providing them the systematic knowledge on disaster risk reduction, and building their capacity to be resilient to disasters are of tremendous importance. In this context, disaster risk redcution education comprising both education governance and educational activities, which origins from school and spearheads effects to community, is essential for reducing risk and building resilience to disasters.

Climate-related disasters and impacts

Recent reports has confirmed that there were 2.9 billion people affected by natural disasters during the period of 2000-2012, account for 41.4 per cent of the total population in 2013 (EMDAT 2013). Asia is one of the most disaster-prone prone regions. In 2008 natural catastrophes and man-made disasters caused 240,500 fatalities, most of which happened in Asia (228,400) (SwissRe 2009). An examination on the dataset of natural disasters from 1900-2013 shows that 88 per cent of the affected people located in Asia, particularly 98 per cent of this number is born by climate-related disasters (Figure 1.1 and 1.2). Furthermore, of the total increase in the number of people affected by natural disasters from the period of 1961–1970 to 2001–2010, 89 percent is assigned for Asia region (Table 1.1).

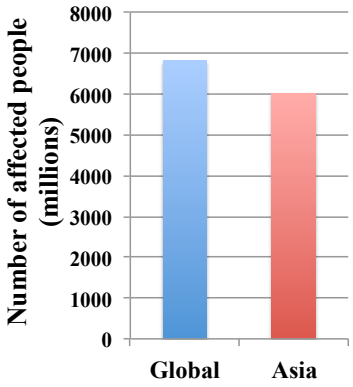

Figure 1.1 Number of affected people by natural disasters in Asia and worldwide (1990-2013)

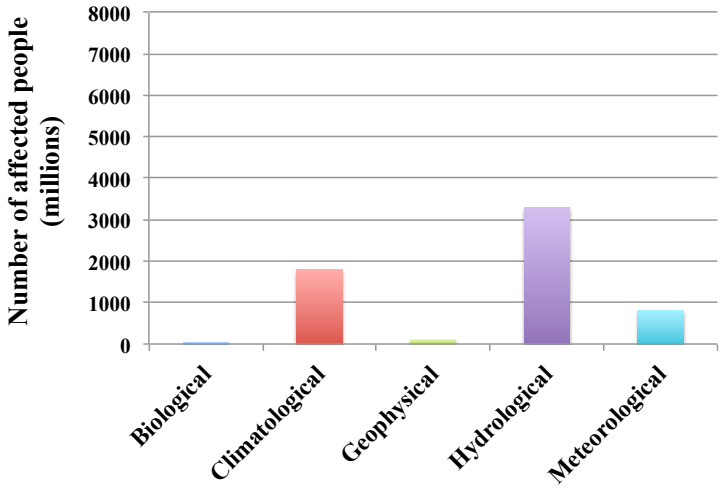

Figure 1.2 Number of affected people by subgroups of natural disasters in Asia (1990-2013)

Source: EMDAT 2013[1]

Table 1.1 shows an increasing trend of damages by natural disasters from the period of 1961–1980 to 2001–2010 of Asia and worldwide (EMDAT 2013). Over 96 per cent of this increase is due to subgroup of disasters such as hydrological (47.2 per cent), climatological (32.8 per cent) and meteorological (16.2 per cent), while geophysical events and biological disasters only accounted for 3.8 per cent of the increase (EMDAT 2013).

	Global	Asia
1961-1970	243.8	201.4
1971-1980	581.3	507.3
1981-1990	1,268.2	1,081.6
1991-2000	2,150.1	1,941.5
2001-2010	2,502.0	2,220.6
1961-2010	**6,543.2**	**5,829.4**

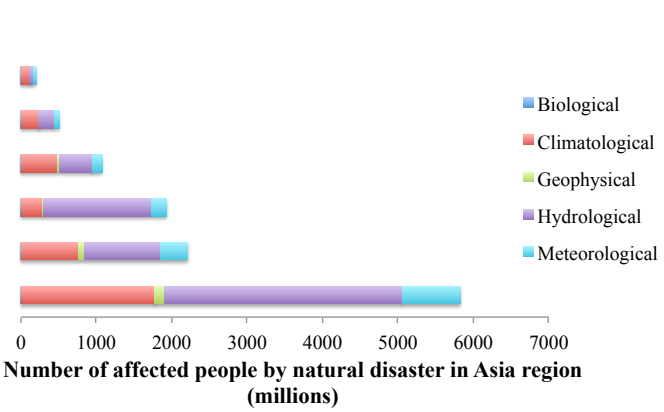

Table 1.1 Increasing of affected people by natural disasters in Asia and worldwide

[1] EMDAT has defined **Affected** as people requiring immediate assistance during a period of emergency; it can also include displaced or evacuated people

This study therefore focuses on climate-related disasters, particularly hydrological and meteorological disasters such as floods and typhoons. Floods and typhoons can damage infrastructure, displace people, and hurt livelihoods; but they are commonly less deadly and more amenable to forecasting than earthquakes (ADB 2013). This highlights the need for effective disaster response practices but in particular for preparedness and prevention mechanisms to reduce damages and increase resilient to disasters

Damages of natural disasters on education sector

There has been growing evidence of severe damages from climate related disasters on the education sector in terms of school collapse and student lives. In 2008, Myanmar was struck by Cyclone Nargis which resulted in a loss of more than 140,000 lives and damages worth billions of dollars. It was reported that more than 4,000 schools were destroyed and about 600,000 children were affected (UNICEF 2009). In Vietnam, the Ministry of Education and Training (MOET) (2011) in Vietnam has reported that education sector is one of the most vulnerable to climate change as it covers a large number of people, accounting for nearly one quarter of the country's population. An estimated 5,120 schools were fully or partially damaged by Typhoon Xangsane (2006), most of these located in Central Vietnam (CCFSC 2010). The destroyed school buildings and damaged facilities and equipment are among those which limit children's access to education. More important, mal-function of disaster management and lack of awareness as well as appropriate knowledge on disaster risk reduction even bring more damages to the school students. For examples, during Tsunami 2004, it is reported that the number of factalities is more than 60,000 children and tremendous economic losses. According to SEEDS India (2008) this number of deaths and losses was mainly due to the failure of ineffective management on disaster preparedness and risk reduction measures. Another example from the historical flood 2010 in Pakistan, which direct and indirect affected 1.6 million children and being claimed for reduced educational services as well as educational interuption as a result of long time recovery process (Khan and Ali 2014). Even when life losses is less and damages to school buildings are tractable, there are still different matters that obstruct educational continuity such as shortage of school teachers or schools continued to be used as evacuation shelter for a long time after disasters (Shaw and Takeuchi 2012). Not only catastrophes or calamities that stroked school buildings and strongly impacted education sector (ODI 2012), smaller events that

occur with high frequency also adversely affecting education system worldwide (Gupta 2014). Therefore, it is the facts that better preparedness and effective planning on education for disaster risk reduction will lead to more efficient recovery, ensure continuity of education and enable educational resilience to disasters.

Disaster Risk Reduction Education (DRRE)

Steps torward disaster risk reduction has been implemented as one main concern of United Nation, including the International Decade for Natural Disaster Reduction (IDNDR), the adoption of the International Framework for Action for the International Decade for Natural Disaster Reduction, the Yokohama Strategy and Plan of Action for a Safer World adopted by the 1st World Conference on Natural Disaster Reduction, the endorsement of the International Strategy for Disaster Reduction, and the adoption of the Hyogo Framework for Action at the 2nd World Conference on Disaster Reduction in 2005. These milestones has provided background and updated frameworks for incorporation of disaster risk reduction activities into different sectors including education sector. Yokohama Strategy highlighted that disaster prevention and preparedness should be considered as integral part of development policy and planning at all levels (UNISDR 2004). The Hyogo Framework for Action identified education as key to mitigate the impact of natural disasters. In particular, the concept of disaster risk reduction using knowledge, innovation, and education to build a culture of safety and increase resilience has been emphasized (UNISDR 2005). Under the umbrella of Hyogo Framework for Action, research and actual implementation of education for disaster risk reduction have been promoted from international, national to local such as community and school levels. Researches on disaster education has repeatedly reiterated two important points: (i) formal education play an inevitable role in knowledge development and (ii) participation of various stakeholders as well as strengthen relationship between school and community (Shaw and Kobayashi 2001, Shaw *et al.* 2004, Bonifacio 2010, Gwee *et al.* 2011, Shaw *et al.* 2011a, Shaw *et al.* 2011b, Fernandez 2012, Goto and Aihara 2012, Gupta and Nikam 2014, Matsuura and Shaw 2014). In particular, the application of DRRE plays a crucial role in many developing countries, where school education is often underdeveloped, thus limiting children's capacity to withstand natural hazards (Petal 2009).

In Vietnam, national initiatives have been implemented to popularize education for disaster risk reduction. From 2007, the National Strategy for Natural Disaster Prevention, Response and Mitigation 2020 established and set up a component on

integrating disaster risk reduction into the formal education and training system (GoV 2007). Toward this, the MoET has developed an Action Plan on implementing National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020 (MoET Vietnam 2011). In one way, this helps to put DRRE as a policy priority, allocate the necessary resources, enforce its implementation, and facilitate participation by all relevant stakeholders. In another way, such forceful announcements at national level has urged local authorities to incorporate DRRE into local development planning in general and into educational development planning in particular. However, specific guidance on how to plan for DRRE and to integrate DRRE into overall planning at local level has not yet developed and localized. In consequence, despite those strong commitments at national level, the implementation of DRRE at local level is still in its infancy. Within this context, the research is an attempt to contribute to the promotion of DRRE in Vietnam through development of assessment tool for DRRE planning as well as innovative model for the integration of DRR into teaching and learning activities in schools.

Important role of schools in DRRE

Increasing awareness has been paid on the fundamental roles of school and school education to provide the best avenue for students to learn about natural disasters (Reyes *et al.* 2011), to equip students with needed skills to response properly to the natural hazards that they face (Fernandez 2012), and to link students to their locality in a way that community resilience can be built in a sustained way (Shaw *et al.* 2011b). The prominence of school education is viewed as advantageous over different types of community or family education on disaster risk reduction for such factors as: (i) school education is the unique system that offers formal education, which provided students with systematic knowledge on disaster and disaster risk reduction; (ii) school education ensures continuing and sustained disaster activities not only through formal but also across non-formal and informal education; (iii) school is the center of community, facilitating school DRRE therefore improve social capital through building connection between school, family and community. This is especially crucial for urban areas where schools gradually lose their roles as vehicle of community cohesion and bonding, one of the most important values of effective disaster risk reduction.

1.2 Research statement

In the context of increasing damages from disasters, the highly recognition on importance of disaster preparedness and response, as well as the vital role of school and school education for disaster risk reduction, this research is an attempt to contribute toward efforts on reducing risk and building resilient capacity in the education sector. It tries to find out appropriate approach for facilitating DRRE from school level. The target of the study is primary education system in Central Vienam, one of the regions most impacted by natural disaster in Vietnam. There are some reasons that the research focuses on primary education rather than secondary education: (i) the accomplishment of universal primary education in Vietnam has been achieved since 2010. It means that a concentration on primary level have the largest access to primary age children among different levels; (ii) the outer number of students in primary education compare to secondary education also provides greater chance for largely distribution of effects on disaster risk reduction; (iii) primary age children are the first in their family to attend school, which attracts most attention as well as involvement of their families and communities. This also makes primary students the best among different diffusion agents for information on disasters and disaster risk reduction.; and (iv) if considering response to natural disasters is an important life skill, inclusion of it in primary education if of extreme important.

In order to investigate the implementation of DRRE in practice, this research concentrates on advancing two key important aspects of educational resilence including educational governance and educational activities. Educational governance includes activies related to educational management, policies, guidance, processes and decision-making on the implmentation of disaster risk reduction. Meanwhile, educational activities mentions to all teaching and learning activities inside or outside of school, which target school students. On this basis, comprehensive understanding of DRRE will be considered to provide a strategic approach for building resilience of the primary education system in Central Vietnam. The ultimate purpose of the study is to maximize effectiveness of educational governance and educational activities in a way that help to strengthen educational resilience to natural disasters.

1.3 Research locations

Central Vietnam is the most disaster prone areas in Vietnam with a complicated topography of mountain, low-plain land and coast. Statistic data from EMDAT (accessed on Jan 2014) shows that five out of the top ten costliest disasters occurred in Central Vietnam. Besides, annuall data on damages of natural disasters, which is provided by CCFSC (accessed on Jan 2014), proves that Central Vietnam bears the largest amount of damages among other regions in most of the year from 1989 to 2009. The region is especially subject to severe climatic hazards such as typhoons and floods, among others. The research focuses on the two areas: (1) Thua Thien Hue Province belongs to the North Central Coast and (2) Da Nang City locates in the South Central Coast. These two regions share the same topographical characters, as they are composed of mountainous, plain and coastal land. However, the socio-economic development is quite different between the two. Hue experiences a slow process of urbanization and the majority of districts in Hue are categorized as rural areas. Meanwhile, Da Nang City exposes to a rapid urbanization with a large number of urban school located in coastal areas. Therefore, it is interesting to focus on the two regions to explore the impacts of economic growth and development on the capacity of school to response to disasters, as well as of education system as a whole.

Located in the North Central province of Vietnam, Thua Thien Hue Province lies from 16 to 16.80 North latitude and from 107.8 to 108.20 East longitudes. It is situated in a narrow strip of land with the length of 127 km and the average width of 60 km. The province has a total area of 5,054 km^2 with 126 km of coastline and a population of 1,105,000 people (TTHPPC 2005a). It has all kinds of topography such as forest and mountain, hills and mounts, coastal plain, lagoon, and sea. Its topography is complicated and strongly partitioned lowering gradually from West to East. Due to its location in a tropical monsoon area, the average annual temperature is 25^oC in the plains and in the hills and only 21^oC in the mountains. The lowest average monthly temperature is in January at 20^oC. The annual precipitation in the province is 3,200 mm with significant variations. Depending on the year, the annual average precipitation may reach 2,500-3,500 mm in the plains and 3,000-4,500 mm in the mountains. In some years, the rainfall may be much higher and reaches to more than 5,000 mm in the mountains (TTHPPC 2005b). The rainy season is from September to December and about 70 per cent of the precipitation is accounted for in those months.

Rainfall often occurs in short heavy bursts which causes flooding and erosion (GoV 2004). Thua Thien Hue Province is divided into 8 districts: A Luoi, Huong Thuy, Huong Tra, Nam Dong, Phong Dien, Quang Dien, Phu Vang, and Phu Loc. The capital city of Hue is its own municipality with 150 communes, precincts, and towns.

Da Nang lies between latitudes 15055' and 16014'N and longitudes 107018' and 108020'E. It covers an area of 1,256 km² with a population of 887,069 people (in 2009), and is estimated to reach one million by 2014. 86.9 per cent of Da Nang's population lives in urban areas, with an average annual urban population growth of 3.5 per cent (GSO Viet Nam 2009). Da Nang's topography is dominated by the steep Annamite mountain range to the north and northwest, featuring peaks ranging from 700 to 1,500 meters in height, and low-lying coastal plains with some salting to the south and east, with several white sand beaches along the coast (Da Nang People's Committee website). It has a tropical monsoon climate with two seasons: a typhoon & wet season lasting from September through March and a dry season lasting from April through August. Temperatures are typically high, with an annual average of 25.9 °C. Temperatures are highest between June and August (averaging 33 to 34 °C) and lowest between December and February (averaging 18 to 19 °C). Cold, wet and windy in winter, bringing even lower temperatures in December and January. The annual average for humidity is 80.6 per cent, with highs between October and December (reaching 84 per cent) and lows between June and July (reaching 74–75 per cent) ("Weather base: Historical Weather for Da Nang". Accessed on 11 August 2012). On average, Da Nang receives 2,505 mm of rainfall. Rainfall is typically highest between October and November (ranging from 550 to 1,000 mm) and lowest between January and April (ranging from 23 to 40 mm). Da Nang receives an average of 2156 hours of sunlight annually, with highs between 234 and 277 hours per month in May and June and lows between 69 and 165 hours per month in November and December (Da Nang People's Committee website). The city has the highest urbanization ratio among the provinces and municipalities with only eleven rural communes, the fewest of any provincial level unit in Vietnam. Da Nang is divided into seven mainland districts and one island district: Cam Le, Hai Chau, Hoa Vang, Lien Chieu, Ngu Hanh Son, Son Tra, Thanh Khe and Hoang Sa.

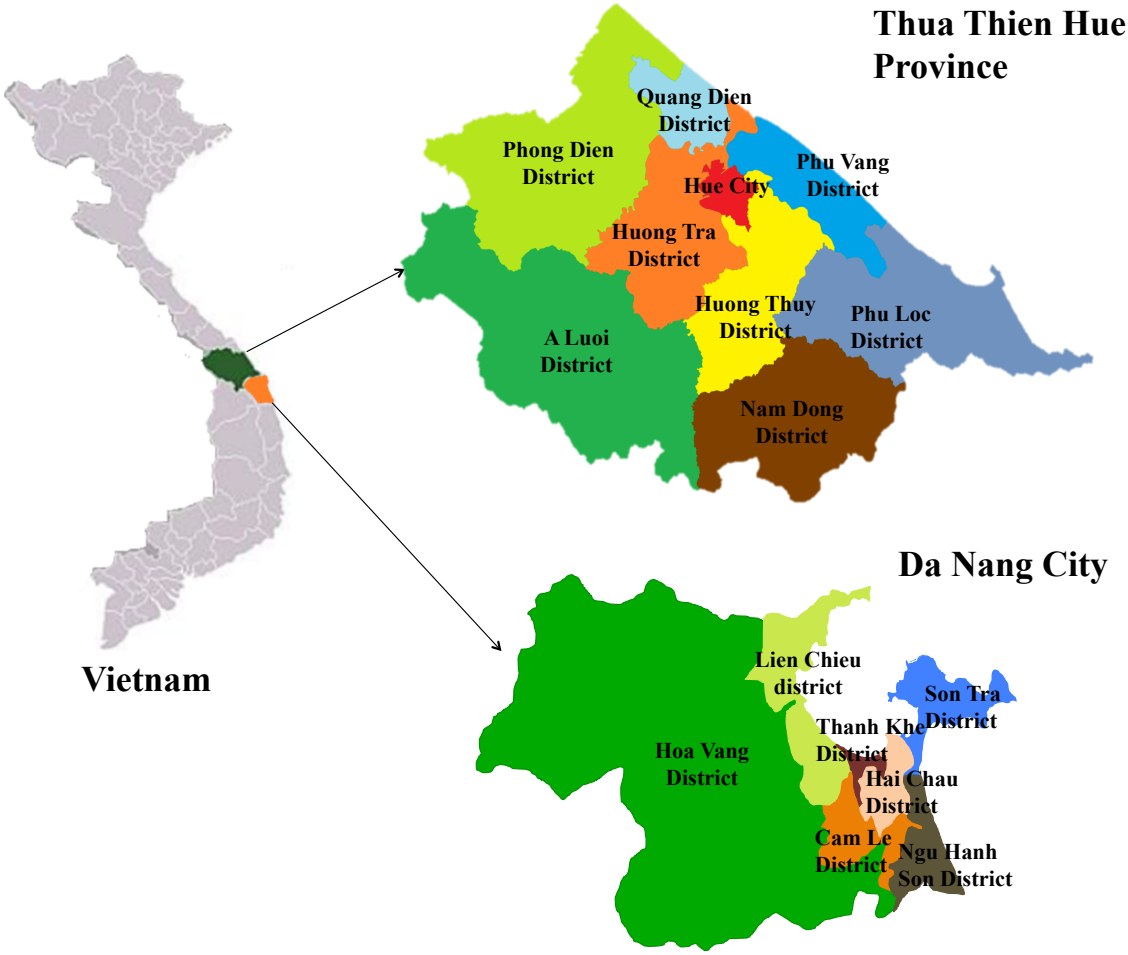

Figure 1.3 Map of study sites in Thua Thien Hue Province and Da Nang City, Vietnam

1.4 Research objectives and questions

While it is widely recognized the important role of school and school-based education for disaster risk reduction, a comprehensive approach that takes into account various aspects from school structural and non-structural safety, external relationship between school and community, teacher training, and integration of disaster risk reduction has not been paid sufficient attention. This research seeks to develop an innovative approach on DRRE, which encompasses far more than educational activities in school and also considers educational governance on disaster risk reduction.

The study targets primary education in Central Vietnam, to investigate the level of school resilient to disasters and advance understanding on the implementation of DRRE from school level. The specific objectives are as the following:

- To assess resilient level of primary schools looking into different aspects of DRRE;

- To examine DRRE planning using school-based approach with involvement of various stakeholders, including formulation of a model for integration of disaster risk reduction into teaching and learning activities;

- To develop a strategic framework and step-wise process for the implementation of school-based DRRE toward building resilience for primary education system

To tackle the objectives as mentioned above, the study quests for answers of the following questions:

- What are the key factors of educational disaster resilience and in what way schools can be assessed in a certain level of resilience to climate-related disasters?

- How to plan for DRRE, as well as to integrate disaster risk reduction into teaching and learning activities?

- How to operate school DRRE in a way that helps to enhance resilience for the primary education system?

1.5 Research methodology

This study employed a wide range of research methods including literature review, questionnaire survey, key informant interview, stakeholder workshop and focus group discussion. In the data collection, quantitative and qualitative method was applied to take the merits of both measures to define the level of resilience for schools and to assess teachers' perception and training needs in the field of education for disaster risk reduction (Table 1.2).

1.5.1 Literature review

At first, review of literature was carried out on relevant materials and publications in the fields of educational resilience, DRRE, school based approach, and background of the study location. This aimed to draw an overview on the current situation of education for disaster risk reduction and orient the study toward an innovative approach in building educational resilience in Vietnam. Another review of national policy and national action agenda was done to provide inputs for the study of

governmental policies toward the implementation of education for disaster risk reduction.

1.5.2 Questionnaire survey

The study developed two types of questionnaires, the first was about School Disaster Resilience Assessment (SDRA) and the second targeted teachers' experiences and training needs regard to education for disaster risk reduction in Central Vietnam. The collection of primary data was accomplished by four times of questionnaire survey, specifically: (1) the first survey on SDRA for all primary schools in Thua Thien Hue Province and (2) Da Nang City; (3) survey on teachers' experiences and training needs in 36 primary schools in Hue City and 95 primary schools in Da Nang City; and (4) the second survey on SDRA for all primary schools in Hue City after two years of the implementation of education for disaster risk reduction. Details of each survey were fully described in Chapter 4, 5 and Chapter 6.

Table 1.2 Time schedules of field activities

Time schedule	**Contents**	**Places**	**Tools**	**Inputs**
2 Feb-29 Mar 2011	Consult on the content of the questionnaire	Thua Thien Hue Province	Focus group discussion 1	Chapter 4
	School disaster resilience assessment (SDRA)		Questionnaire survey 1	
2 Feb-30 Mar 2012	SDRA	Da Nang City	Questionnaire survey 2	Chapter 4
	Formulating educational disaster resilience actions (EDRA)	Hue City Da Nang City	Focus group discussion 2	Chapter 5
	Stakeholder analysis	Hue City	Workshop 1	
	Stakeholder analysis	Da Nang City	Workshop 2	
3 Jul-19Aug 2012	Policy analysis of education for disaster risk reduction	Ha Noi City	Literature review Key informant interview 1	Chapter 3
	Curriculum tracking		Literature review	Chapter 6
20 Feb-29 Mar 2013	Teachers' experiences and training needs on DRRE	Hue City Da Nang City	Questionnaire survey 3	Chapter 6
	SDRA (second time)	Hue City	Questionnaire survey 4	Chapter 4
31 May – 26 Jun 2013	Understanding implementing mechanism for EDRA at school level	Hue City Da Nang City	Key informant interview 2	Chapter 5

1.5.3 Focus group discussion

There are two focus group discussions (FGDs) were carried out. The first FDG is to consult with educational staff at different levels on the content of the SDRA questionnaire to ensure that the content fits with educational system in Vietnam, as well as at local level. The second FDG was carried out to formulate educational resilience actions based on the framework of SDRA. This FDG was done with participation of school principals, school teachers, provincial and district DoET staff from Hue Province and Da Nang City. During the FDG, participants were requested to discuss and develop the actions for building educational resilience based on variables of SDRA, wherever interventions are available to improve the schools' capacity in response to disasters.

1.5.4 Key informant interview

There are two times of key informant interview have been done. First, in order to supplement data for the review of national policy and action agenda, key informant interview was undertaken with Vice Deputy of Department of Science-Technology, Ministry of Education and Training. The interview mainly focused on educational policy formulation process, role of education sector in disaster risk management and future perspective of policy on DRRE. The second key informant interview was carried out with schools principals of four schools, which were selected based on the result of SDRA, as the highest and lowest score of SDRA in Hue Province and Da Nang City.

1.5.5 Workshop

To identify the role of key stakeholders and their participation in the implementation of DRRE, there were two stakeholder workshops carried out with participation of representatives from DoET, schools (principals, teachers, and students), family, community, and other organizations in Hue Province and Da Nang City.

1.6 Structure of thesis

The thesis comprises of eight chapters presenting the importance of school-based DRRE in building resilience for education sector in Central Vietnam. Figure 1.4 explains the structure and the linkage between chapters of the thesis.

Chapter 1 gives an overview of the background, study location and objectives of the search. It also provides a compendious introduction of research framework and methodology used to carry out to collect primary and secondary data.

Chapter 2 provides the background information of climate disaster and its impacts to all sectors, in particular to education sector. It explains the reason why education is being promoted by international and national programs as one of the prioritization for disaster risk reduction. This chapter also consists of literature review on various concepts of resilience applied in different fields from physics, ecology, social studies, economics, etc., which forms the basis for the formulation of the concept of disaster educational resilience. Later, key factors of disaster educational resilience are discussed, which contribute to the development of SDRA tool in Chapter 4.

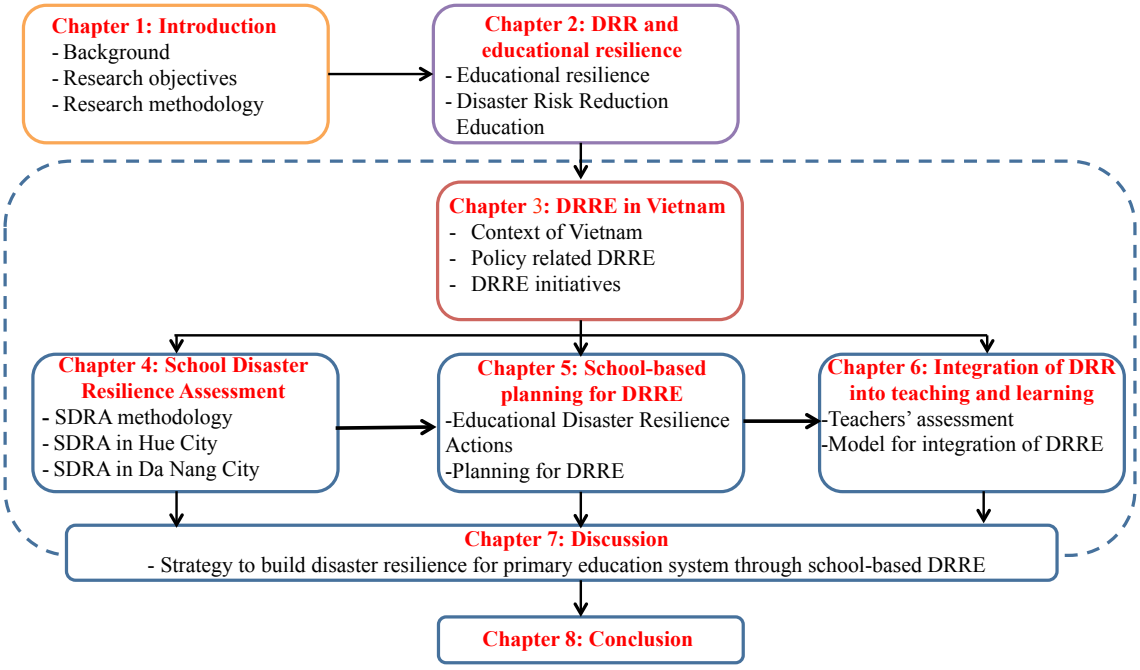

Figure 1.4 Structure of the thesis

Chapter 3 introduces the milieu of Vietnam including natural conditions, socio-economic development, and natural disaster profile. Besides, education context, legal and institutional system supporting DRRE, as well as initiatives by governmental body and other organization in promoting DRRE are described. This helps to provide background information for the research and also for the selection of indicators of SDRA later in Chapter 4.

Chapter 4 develops an innovative methodology to assess the resiliency of school based on the framework of Climate Resilience Disaster Index and 16 tasks of Hyogo

Framework for Action designated for education sector. This tool will be then applied to assess resilient level for all primary schools in Hue Province and Da Nang City. Results of the findings from the study areas helps to define the resilience of primary schools in urban and rural areas, and in different geographical locations as well. Findings from the assessment of SDRA in this chapter will be input for the development of DRRE plan in Chapter 5.

Chapter 5 compiles the process of planning for DRRE using school-based approach in a participatory manner, whereby schools' teachers and students play a leading role in most of the stages. Basically, five steps are described as the following: (1) resilience mapping, (2) developing educational disaster resilience actions, (3) stakeholder analysis and setting up time schedule, (4) prioritizing actions, (5) propose implementing mechanism. Findings in Chapter 5 has confirmed the importance of teachers' training as entry point for the employment of DRRE, which will be examined more in Chapter 6.

Chapter 6 investigates teachers' perception on the implementation of 20 prioritized actions, as well as teachers' experiences and training needs on DRRE. Review of the national textbook at primary level is carried out to track for the disaster risk reduction related contents and to seek for potential space for the incorporation of disaster risk reduction in the future. Results from teachers' assessment helps to develop model to integrate disaster risk reduction into teaching and learning activities in schools.

Chapter 7 discusses the findings from the earlier chapters and provides inputs to form strategy of school-based DRRE and the step-by-step process in assessing, planning, integrating disaster risk reduction toward building resilience for education sector in Central Vietnam. Lastly, the issues on replication of the strategy in different regions and countries are considered.

Finally, the thesis ends with chapter 8, which concludes the key findings from the research and make recommendations for future researches of DRRE.

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Chapter 2 Disaster risk reduction and educational resilience

This Chapter will firstly provide an overview about the climate related disasters and impacts, the development of conceptual and empirical works on Disaster Risk Reduction (DRR). Secondly, the study discusses variations among the different concepts defined resilience. It also reviews several studies that contributed to develop the key factors to build educational resilience. Resilience framework for Disaster Risk Reduction Education (DRRE) will be developed to form a basis for the formulation of resilience assessment tool in the Chapter 5. Before that, the definition, principals, and evolution of DRRE will be presented to provide an understanding how DRRE can be implemented in practice to reduce disaster risks and building educational resilience.

Contents

DISASTER RISK REDUCTION AND EDUCATIONAL RESILIENCE

2.1 Introduction

Facts and figures only cannot describe a full picture of damages from natural disasters. Compare to the fact that nearly 2.6 billions people who loss their lives due to natural disaster from 1907 to 2011 (UNESCAP and UNISDR 2012), the repercussion that their relations has to bear is tremendous. Disasters happened and affected everybody from the developed and developing countries, the rich and the poor, man and woman, the non-educated and well-educated. The recent years has witnessed a number of calamities, which have shown that the developing and developed countries are stroken by natural hazards. For example, the 2004 Indian Ocean intercontinental tsunami, the 2005 Hurricane Katrina in the United States, the 2005 earthquake in Pakistan, the 2008 Nargis cyclone in Myanmar, the 2010 earthquake in Haiti, the 2010 floods in Pakistan, the 2011 tsunami in Japan, the 2013 typhon Haiyan in the Phillipines (EMDAT 2013). However, the level of exposure as well as the ability to response and recover is of extreme variation. For most of the cases, the developing countries, particularly the least developed countries, the poorest people, among others, have lesser capacity to adapt and are more vulnerable to climate change damages, just as they are more vulnerable to other stresses (IPCC 2001). It is because the poor outnumber the rich and live in greater density in more poorly built housing on land most at risk. More than 90 per cent of population growth is in the developing world, among people with the smallest share of resources and the biggest burden of exposure to disasters (UNISDR 2004). In particular, it is climatic disasters that affect an increasing number of people and cause increasingly vast economic losses. If societies are unable to deal with today's climate-related disasters, then it is likely that disaster-related losses will be as greater with future climate change (IPCC 2007).

People are threatened by hazards because of their socio-economic and environmental vulnerability (Care International 2012). Whether an extreme event

turns into a disaster is highly dependent on the level of preparedness of local and national institutions, as well as on the capacity of communities and individuals to manage the hazard. This means that raising people awareness on risks, providing them the systematic knowledge on DRR, and building their capacity to be resilient to disasters are of tremendous importance. The beginning of the International Decade for Natural Disaster Reduction in 1994 has opened opportunites for numerous efforts from international to local level to work on reducing disaster risks. Education is one of the important tool that helps to develop a wide array of approach to support DRR work. Indeed, only in three years from 2005 to 2008, research found that 50 out of 82 national organizations had carried out structured public-awareness and education activities on disaster reduction, 38 per cent of which were connected to children and schools tools to support these activities (International Federation of Red Cross and Red Crescent Societies 2009).

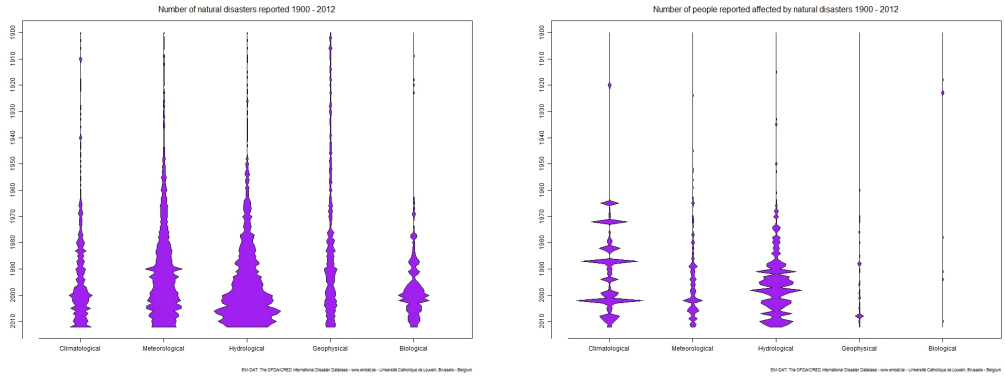
The objective of this Chapter is first to draw on the fact of climatic disasters, the conceptual and empirical works on DRR. Second is to outline core conceptual elements of resilience and to structure understanding on disaster resilience and educational resilience. Third is to define DRRE, to view the international and national efforts on DRRE, to identify the different types of DRRE, as well as approaches are being used to promote DRRE in practice.

2.2 Climate related disaster and Disaster risk reduction

2.2.1 Climate related disasters

There has been a sharply increase in the number of natural disasters reported in the period of 1900-2012 (EM-DAT 2013). The notable feature is a significant rising of climate related disasters for the past century (Figure 2.1a). Together with the growth of number of natural disasters, the numbers of people affected has been also increasing globally as shown in Figure 2.1b. It is noted that the number of fatalities is now declining for all regions, including in the Asia-Pacific region where most of the risk is concentrated (Peduzzi 2012). There were about 2 million people reported killed by disasters in the Asia-Pacific region between 1970 and 2011, representing 75 per cent of all disaster fatalities globally (UNESCAP and UNISDR 2012). Among different types of disasters, the number of people in the Asia-Pacific exposure to hydro-meteorological hazards continues to rise. While the Asian-Pacific population

increased by 91 per cent from 2.2 billion to 4.2 billion between 1970 and 2010, the average number of people exposed to flooding every year more than doubled from 29.5 to 63.8 million (Herold 2009, Herold and Mouton 2011).



(a) (b)

Figure 2.1 The numbers of natural disasters (a) and the numbers of affected people from 1990 to 2012 (Source: EM DAT 2013)

Besides lives losses, the incidence and economic impacts of climate related disasters followed the onward trend over recent decades (World Meteorological Organization, Co-operative Program on Water and Climate et al., 2006). In particular, economic losses re tremendous when critical infrastructure is hit: in 2005, hurricane Katrina led to the closure of 700 schools; in Louisiana 40 schools were destroyed and 875 were damaged and in Mississippi 16 schools were destroyed and 287 were damaged. The Congress had to appropriate US$ 645 million to cover education costs for the 372,000 displaced school children for the 2006-2006 school year (UNCRD, 2009). During the 2005 Kashmir earthquake around 8,000 school buildings collapsed and 18,000 children died (SwissRe, 2009). An estimated 5,120 schools were fully or partially damaged by Typhoon Xangsane (2006) in Vietnam, resulting in a total loss of 300 million USD (CCSFC 2010). In 2008, Myanmar was struck by Cyclone Nargis, which resulted in a loss of more than 140,000 lives and damages worth billions of dollars. It was reported that more than 4,000 schools were destroyed and about 600,000 children were affected (UNICEF 2009). Recently, Japan Ministry of Education, Culture, Sports, Science and Technology reported that nearly 6,284 public schools and 733 school students and teacher died or are missing as a result of the Tohoku Earthquake and Tsunami in 2011 (Shaw et. al., 2011).

Despite considerable attention and efforts in school safety and disaster preparedness, there is growing evidence of the negative impacts of climatic disasters

on the education sector. The destroyed school buildings and damaged facilities and equipment are among those which limit children's access to education. Following a disaster, students can be out of school for weeks, months, or even years. Thus, the education sector is strongly affected not only during but also on the aftermath of a disaster due to educational discontinuity and recovery. This highlights the need for effective disaster response practices and mechanisms but in particular for improved disaster risk reduction to decrease disaster vulnerability and mitigate impacts.

2.2.2 Disaster risk reduction

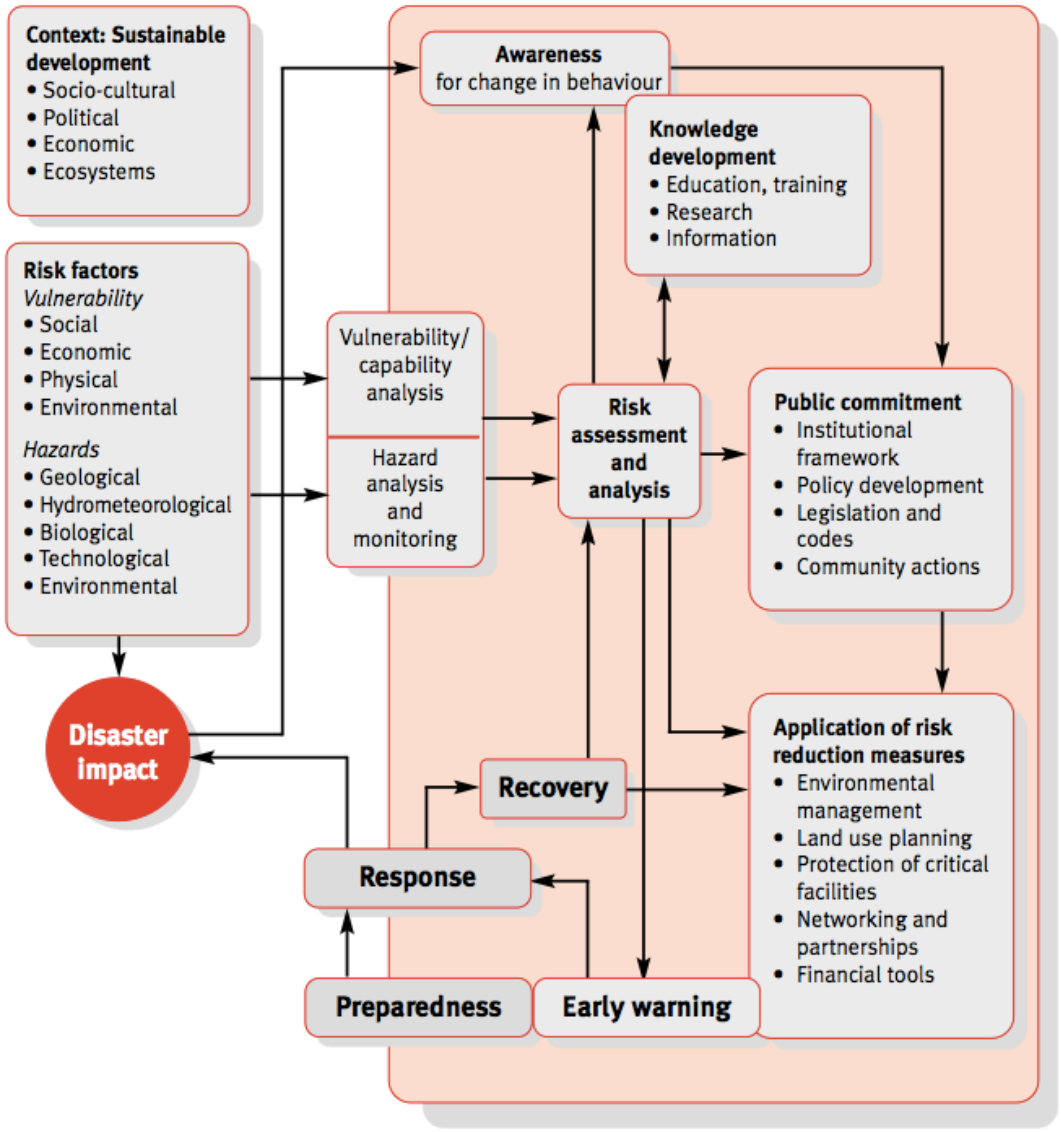
For the last several years, Disaster Risk Reduction (DRR) has gained its strong recognition due to the increased loss and damages of human life and economic assets caused by the impact of natural hazards and through the evolution of the international discussion on DRR.

Looking back the past decade, there was a significant shift in disaster management towards a more comprehensive understanding of the reduction of disaster risks and towards the "development of a forward-looking and longer -term strategy for anticipating and managing risk" (Thomalla *et al.* 2006). The following session will review through a brief history of international efforts on the development of DRR.

On December 11, 1987, the United Nations General Assembly declared the 1900s as "The International Decade for Natural Disaster Risk Reduction (IDNDR)". The objective is to contribute to technical and scientific buy-in and to make DRR agenda imperative.

The World Conference Disaster Reduction (WCDR) in 1994 has been considered as one of the first international blueprint for DRR, which focus largely on social and community development. Principle 6 of Yokohama Strategy and Plan of Action for a Safer World states "Preventive measures are the most effective when they involve participation at all levels, from community to the regional and international level".

As part of the effort on reducing risks, UNISDR (2004) developed one of the first frameworks for DRR (Figure 2.2), which describes the general context and primary activities of disaster risk management (UNISDR 2004). The framework is considered as a comprehensive DRR framework as it took into account various elements necessary for an effective DRR strategy.



Living with Risk: A Global View of Disaster Reduction Initiatives (Geneva: UN International Strategy for Disaster Reduction, 2002), p. 23.

Figure 2.2 Framework for Disaster Risk Reduction (Source: (UNISDR 2004)

In order to promote a common understanding and usage of DRR concepts and to assist the DRR efforts of authorities, practitioners and the public, UNISDR has developed the glossary with numerous terms related to DRR. For example, "Disaster Risk" was defined as "The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or society over some specified future time period, caused by a natural event or a technical failure". Mathematically, this statement can be presented as below

(Disaster) risk = Hazard * Vulnerability / Capacity

Consequently, the term of “Disaster Risk Reduction” or “Disaster Reduction” was defined as “The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development (UNISDR 2004). Synonymous terms such as “Disaster Risk Reduction” or “Disaster Reduction” have been used interchangeably in describing DRR however, the term “Disaster Risk Reduction” provides a better recognition of the ongoing nature of disaster risks and the ongoing potential to reduce these risks (UNISDR 2004).

The role of DRR has been tackled to contribute in reducing risks, which takes into account potential risks and plans to reduce them, involving everyone and providing people not only help but also hope. As described in the publication of UNISDR (2004) "Living with Risk: a global review of disaster reduction initiatives", the DRR framework is composed of the following fields of action:

- Risk awareness and assessment including hazard analysis and vulnerability or capacity analysis;
- Knowledge development including education, training, research and information;
- Public commitment and institutional frameworks, including organizational, policy, legislation and community action;
- Application of measures including environmental management, land-use and urban planning, protection of critical facilities, application of science and technology, partnership and networking, and financial instruments;
- Early warning systems including forecasting, dissemination of warnings, preparedness measures and reaction capacities.

Another framework called the Pressure and Release (PAR) model developed by Wisner et al. (2004). The PAR model was introduced as simple tool for showing how disasters occur when natural hazards affect vulnerable people (Figure 2.3). Their vulnerability is rooted in social processes and underlying causes which may ultimately be quite remote from the disaster event itself (Wisner *et al.* 2004). On this basis, the Crunch model has two main dimensions: hazards and vulnerability, both of which influence the disaster risk. The level of disaster risk therefore depends on the magnitude of the hazard and degree of vulnerability of the people. The disaster

Crunch Model states that a disaster happens only when a hazard affects vulnerable people. A disaster happens when these two elements come together. A natural phenomenon by itself is not a disaster; similarly, a population maybe vulnerable for many years, yet without the "trigger event", there is no disaster. We can therefore see that vulnerability - a pressure that is rooted in socio-economic and political processes - is built up and has to be addressed, or released, to reduce the risk of a disaster.

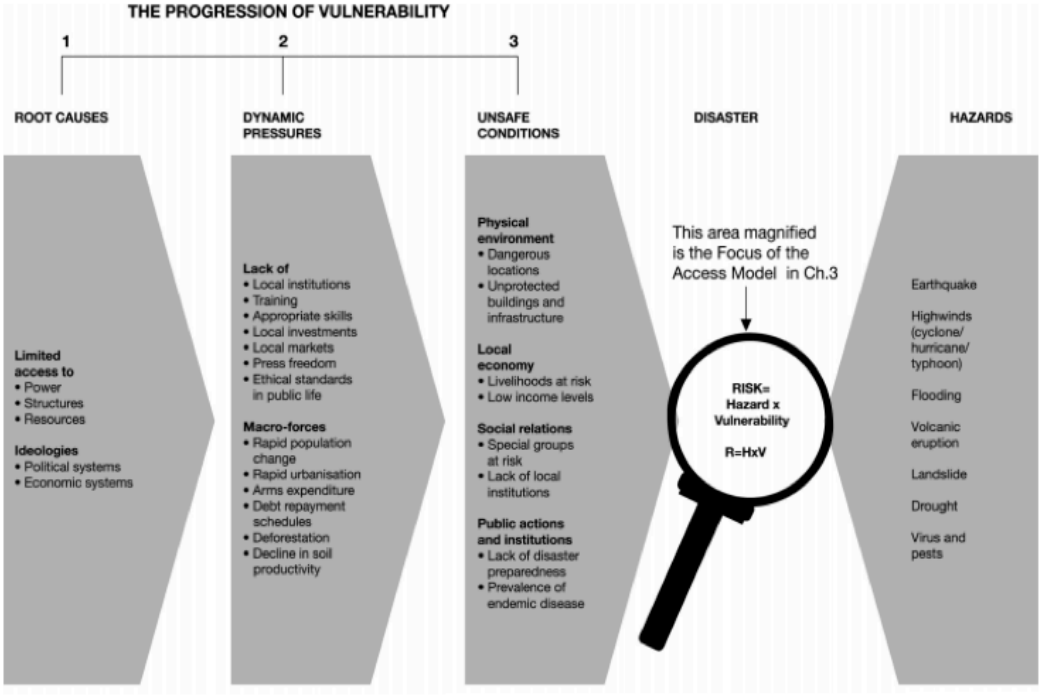


Figure 2.3 Pressure and Release model (PAR) (Source: (Wisner *et al.* 2004)

A comprehensive approach to reduce disaster risks is set out in the United Nations-endorsed Hyogo Framework for Action (HFA), adopted in 2005. One of the expected outcomes of the HFA is "The substantial reduction of disaster losses, in lives and the social, economic and environmental assets of communities and countries" (UNISDR 2007). Also, it is emphasized in the HFA that DRR is extremely essential if the world is subject to succeed in reaching the Millennium Development Goals. In order to achieve it expected outcomes, the HFA identifies five priority areas for action relating to DRR, and specific recommended tasks for each of priorities (Table 2.1)

Table 2.1 Summary of the Hyogo Framework for Actions 2005-2015

HFA 1. Making disaster risk reduction a priority
1.1 Engage in multi-stakeholder dialogue to establish the foundations for disaster risk reduction
1.2 Create or strengthen mechanisms for systematic coordination for disaster risk reduction
1.3 Assess and develop the institutional basis for disaster risk reduction
1.4 Prioritize disaster risk reduction and allocate appropriate resources
HFA 2. Improving risk information and early warning
2.1 Establish an initiative for countrywide risk assessments
2.2 Review the availability of risk-related information and the capacities for data collection and use
2.3 Assess capacities and strengthen early warning systems
2.4 Develop communication and dissemination mechanisms for disaster risk information and early warning
HFA 3. Building a culture of safety and resilience
3.1 Develop a program to raise awareness of disaster risk reduction
3.2 Include disaster risk reduction in the education system and the research community
3.3 Develop disaster risk reduction training for key sectors
3.4 Enhance the compilation, dissemination and use of disaster risk reduction information
HFA 4. Reducing the risks in key sectors
4.1 Environment: Incorporate disaster risk reduction in environmental and natural resources management
4.2 Social needs: Establish mechanisms for increasing resilience of the poor and most vulnerable
4.3 Physical planning: Establish measures to incorporate disaster risk reduction in urban and land-use planning
4.4 Structures: Strengthen mechanisms for improved building safety and protection of critical facilities
4.5 Stimulate disaster risk reduction activities in production and service sectors
4.6 Financial/economic instruments: Create opportunities for private-sector involvement in disaster risk reduction
4.7 Disaster recovery: Develop a recovery planning process that incorporates disaster risk reduction
HFA 5. Strengthening preparedness for response
5.1 Develop a common understanding and activities in support of disaster preparedness
5.2 Assess disaster preparedness capacities and mechanisms
5.3 Strengthen planning and programming for disaster preparedness

(Source: (UNISDR 2007)

Moench (2007) has described DRR as part of a continuous disaster management cycle of activities that move from disaster events through recovery and risk reduction phases until the next event occurs. Many of the elements identified in this cycle – strengthening of resilience, land-use and other planning, insurance and the development of early warning information – should reduce vulnerability to the next event (Moench 2007). The four phases of the disaster risk management cycle was described by Schipper and Pelling (2006) as “Disaster risk management includes both pre-impact DRR -prevention, preparedness, and mitigation- as well as 'response and recovery' post-impact crisis management activities” Preparedness is defined as "activities and measures taken in advance to ensure effective response to the impact of hazards." Mitigation is the "structural and nonstructural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technologic hazards." Figure 2.4 provides an overview of the four phases of the disaster risk management cycle and DRR.

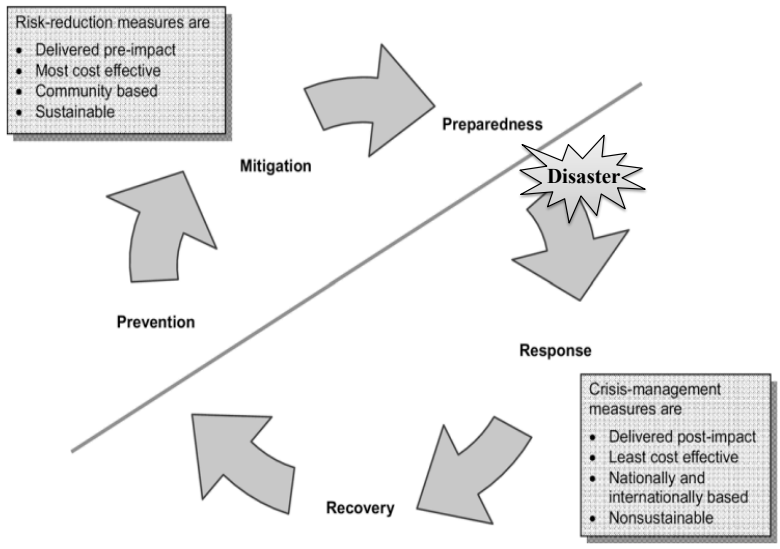


Figure 2.4 A diagram of the disaster risk management cycle comparing risk-reduction measures (above) to crisis-management measures (below) (Source: (Keim 2008)

As such, DRR activities are not part of response and recovery activities, but are often implemented after a disaster as the available funding, political willingness and public awareness has opened up for investments in DRR. In areas with recurring disaster events this means that resilience has increased until the next event. In addition, DRR is generally understood to mean the broad development and application of policies, strategies and practices to minimize vulnerabilities and

disaster risks throughout society (Twigg 2007). According to this study, DRR is a systematic approach to identifying, assessing, and reducing the risks of disaster. It aims to reduce socio-economic vulnerabilities to disaster as well as dealing with the environmental and other hazards that trigger them.

As guided by the global policy set out in the publication of "HFA 2005-2015: Building the Resilience of Nations and Communities to Disasters", the definition of DRR has been updated and revised as "The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events" (UNISDR 2009b).

As Yodmani (2001) and Twigg (2007) discussed, the evolution of the disaster paradigm has been witnessed through several stages starting from the initial stage of responding to a disaster as one-off events and improved preparedness to take proactive public policies through hard measures, which led to the realization of people's vulnerability as soft measures. Then, it has led to a more comprehensive approach with the recognition of reducing vulnerability and exposure to hazards to build resilience of a nation and a community. The link between DRR and resilience has emphasized in academic researches: "Building resilience against disasters has become one of the important concepts within DRR" (Surjan, Sharma and Shaw, 2011). As Asia-Pacific Disaster Report 2012 pointed out, exposure to disaster risk is growing faster than our ability to build resilience and the shared challenge is to control both the growing exposure and rising vulnerability (JNESCAP and UNISDR, 2012). In sum, the main purpose of DRR is to reduce vulnerability and exposure to hazards and to build resilience from impacts of disasters.

2.3 Moving toward educational resilience to disaster

2.3.1 The concept of resilience

The concept of resilience was first introduced in the 1940s with studies of children and trauma in the family and in the 1970s in the ecology literature as a useful framework to examine and measure the impact of assault or trauma on a defined eco-system component to describe the persistence of natural systems in the face of changes (Holling 1973). It was then used in social studies to describe the behavioral

response of communities, institutions, and economies to hazardous events (Timmerman *et al.* 1982). The link between social resilience and ecological resilience was also investigated in Adger's studies (Adger 1997, 2000). Handmer and Dovers (1996) develop the term institutional resilience and provide a framework for considering the rigidity and inadequacy of present institutional responses to global environmental change. Although most definitions of resilience are similar, some delineation among definitions is considered. According to Miletti (1999) (as cited in Cutter et al. 2010, p 1), resilience is the ability of a community to recover by means of its own resources. This study introduced resilience as sustainable hazard mitigation, implying that resilience is defined by a locality's ability to tolerate and overcome damages and losses without significant outside assistance (Cutter *et al.* 2010). In the same way, Twigg (2007) also pointed out the characteristics of a system or community resilience as capacity to absorb stress through resistance or adaptation; capacity to manage or maintain certain basic functions and structures during disastrous events; and capacity to recover or bounce back after an event.

However, it is worth to note that the concept of resilience is not solely used for ecological or social approaches. The concept of resilience is adopted to different fields to describe the ability of a system to get back to its original conditions. The applications of reslience into different fields (such as engineering, education, physics, psychology, etc.) have provided interesting looks of resilience concept through various lens of science (Table 2.2). The social science community tends to focus more on the social aspects of disaster resilience while the engineering or technical community concentrate more on the technical, or physical dimension. For example, human resilience is considered as the human capacity of all individuals to transform and change, no matter what their risks (Lifton 1994). Or the term 'resilience' adapted in the field of physics to define resilience is whereby "a quality of a material or system that returns to equilibrium after stress rather than breaks" (Bosher and Dainty 2011).

In hazard related research, the definition of resilience is refined to mean the ability to survive and cope with a disaster with minimum impact and damage (Berke and Campanella, 2006; National Research Council, 2006). It incorporates the capacity to reduce or avoid losses, contain the effects of disasters, and recover with minimal social disruptions (Buckle et al., 2000; Manyena, 2006; Tierney and Bruneau, 2007). Resilience within hazards research is generally focused on engineered and social

systems, and includes pre-event measures to prevent hazard-related damage and losses (preparedness) and post-event strategies to help cope with and minimize disaster impacts (Bruneau et al., 2003; Tierney and Bruneau, 2007).

Table 2.2 The concept of resilience by types

Types	The concept of resilience	Author
Social resilience	Resilience is the capacity to cope with unanticipated dangers after they become manifest, learning to bounce back.	Wildavsky, 1991
Social resilience	The ability of an actor to cope with or adapt to hazard stress.	Pelling, 2003
Social resilience	The degree to which the social system is capable of organizing itself to increase this capacity for learning from past disasters for better future protection and to improve risk reduction measures	UNISDR, 2005
Social resilience	Three characteristics: firstly, the amount of change the system can undergo and still retain the same controls on function and structure; secondly, the degree to which the system is capable of self-organization; and thirdly the ability to build and increase the capacity for learning and adaptation.	Resilience Alliance, 2007
Educational resilience	Resilience is the heightened likelihood of success in school and other life accomplishments despite environmental adversities brought about by early traits, conditions, and experiences	(Wang *et al.* 1994)
Human resilience	Resilience is considered as the human capacity of all individuals to transform and change, no matter what their risks	(Lifton 1994)
Health resilience	Resilience is the ability of an individual or organization to expeditiously design and implement positive adaptive behaviors matched to the immediate situation, while enduring minimal stress.	Mallak, 1998
Ecological resilience	It is the buffer capacity or the ability of a system to absorb perturbation, or the magnitude of disturbance that can be absorbed before a system changes its structure by changing the variables.	Holling et al., 1995
Ecological and community resilience	The capacity of the damaged ecosystem or community to absorb negative impacts and recover from these.	Cardona, 2003
Community resilience	Local resiliency with regard to disasters means that a locale is able to withstand an extreme natural event without suffering devastating losses, damage, diminished productivity, or quality of life without a large amount of assistance from outside the community.	Mileti, 1999

Types	The concept of resilience	Author
Community resilience to seismic	The capacity to adapt existing resources and skills to new systems and operating conditions.	Comfort, 1999
Community resilience to seismic	The ability of social units (e.g., organizations, communities) to mitigate hazards, contain the effects of disasters when they occur, and carry out recovery activities in ways that minimize social disruption and mitigate the effects of future earthquakes."	(Bruneau *et al*. 2003)
Community resilience	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions	UNISDR, 2009
Organizational resilience	Resilience is a fundamental quality of individuals, groups and organizations, and systems as a whole to respond productively to significant change that disrupts the expected pattern of events without engaging in an extended period of regressive behavior.	Horne and Orr, 1998
Organizational and community resilience	The ability of organization or community to respond to singular or unique events.	Kendra and Wachtendorf, 2003
Psychological resilience	Resilience describes an active process of self-righting, learned resourcefulness and growth— the ability to function psychologically at a level far greater than expected given the individual's capabilities and previous experiences.	Paton et al., 2000
Economic resilience	Resiliency is the ability of a system to recover from a severe shock	(Rose 2004)
Physical resilience	The quality of a material or system that returns to equilibrium after stress rather than breaks	(Bosher and Dainty 2011)

(Source: modified from Manyena (2006))

In sum, disaster resilience is characterized by three main properties, these are:

(1) the speed of recovery at which a system can recover after disaster

(2) the magnitude of an event relative to a threshold that can be absorbed before a system changes its structure by changing the processes and variables that control it, and

(3) the capacity to learn from and to create new things from disaster, and to transform.

According to Waxman et al. (2003), there has been a shift in resiliency research toward education to seek the answer for student's improvements and the social

outcomes as well. The term of educational resilience is first defined by Bernard (1991) as a set of qualities or protective mechanisms that give rise to successful adaptation despite the presence of high-risk factors during the course of development. It is also described as a dynamic process that occurs within a context and is the result of the person's interaction with his or her environment (Rutter 1995). In other way, educational resilience can be emerging as a dynamic and evolving disciplinary effort addressing symbiosis between human activities in a system, which provide a transition pathways from individual resilience to system resilience. Besides, educational resilience is also considered as the accumulation of student resilience, teacher resilience and school resilience (Figure 2.5) (Connell *et al.* 1994, Wang and Gordon 1994).

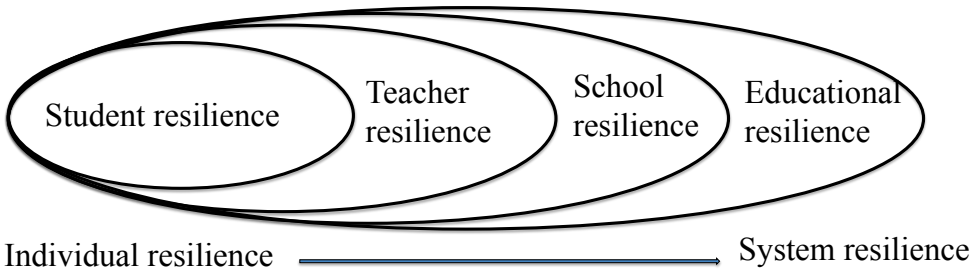


Figure 2.5 Concept of educational resilience

According to Cefai (2008), most studies on educational resilience have mainly concentrated on the academic achievement of children coming from adverse environments. However, while success is an educational variable that researchers often investigate and measure (e.g., cognitive, affective, and behavioral outcomes), adversity is a phenomenon that educators often do not operationally define and study. Students may be exposed to inappropriate educational experiences through their families, schools, or communities (Pallas, Natriello, & McDill, 1989). Therefore, it is important that from the concept of educational resilience, policy makers, administrators, teachers, and parents can understand why some students are resilient and do well in school, while others from the same socioeconomic backgrounds and schools and similar home environments do not do well academically (Cutter, 2008).

In most cases, conceptual and empirical work on resilience in education sector mainly pay attention to human resilience (e.g. student resilience, teacher resilience) and administrative resilience (school resilience) (Waxman et al. 2002), whereby "strength-based" or "solution-based" approach has been utilized (Waxman et al. 2004). Table 2.3 views the constituent elements of educational resilience and disaster

resilience. While disaster resilience measures the ability of a community to recover from disaster and bounce back to its origin through means of enhancing the adaptive capacity. The concept of educational resilience incorporates the ability of education to help students succeed and developed through a concentration on academic achievement. Therefore, the approach to disaster resilience is mainly community-based while educational resilience utilizes solution-based or strength-based. Both of the cases are culture-specific and involve a wide network, which comprises every stakeholder whose actions or decisions have certain effects on the resiliency. Furthermore, assessing disaster resilience is a process that bases on the investigation of vulnerability and adaptive analysis, while measuring educational resilience is a process that takes into account adversity and strength analysis. Understanding the convergences and divergences of both concepts will help for the conceptualisation of educational resilience in the context of disaster in the later part.

Table 2.3. Convergences and divergences between disaster resilience and educational resilience

Disaster Resilience	Educational resilience
Recovery	Success
Bounce back	Develop
Adaptation	Achievement
Community-based	Solution-based or strength-based
Network	Network
Culture	Culture
Vulnerability and capacity analysis	Adversity and strength analysis
Process	Process
Institution	Individual

2.3.2 The conception of educational disaster resilience

In addition to defining the properties of a resilient system, Bruneau et al. (2003) discussed the four interrelated dimensions of the concept: technical, organizational, social, and economic resilience. Clarification of these four dimensions as follow (Bruneau *et al.* 2003):

- The *technical dimension* of resilience regards to the ability of physical systems to withstand and then recover from the impact of a disaster;

- The *organizational dimension* refers to the capacity of organizations responsible for managing and implementing disaster-related functions to effectively perform their duties;

- The *social dimension* of resilience is the extent to which communities and social systems are able to protect against and then recover from the losses in a disaster;

- The *economic dimension* with the ability to reduce both direct and indirect economic losses in this situation

The first two dimensions are relatively straightforward to conceptualize and measure in the context of physical infrastructure systems (Bruneau et al., 2003). Meanwhile, the last two dimensions are less straightforward to quantify. Further studies of the socio-economic dimension can be found in numerous discussions in the broader context of overall community resilience (Adger 2000, Paton and Johnston 2001, Bruneau *et al.* 2003, Paton 2005, Allen 2006, Twigg 2007, Cutter *et al.* 2010, Joerin and Shaw 2011, Prashar *et al.* 2013). For example, according to Adger (2000), the ability of human beings, living in a built environment (physical), to absorb and manage a disaster is shaped by political (institutional), economic and natural dimensions. Paton and Johnston (2001) suggested the involvement of of individual, community and societal levels must be developed in advance in order to transform capacity into more comprehensive capacity. Twigg (2007) defined a number of important factors that a community has to acheive to become a disaster-resilient community, for examples, a 'culture of safety' exists among all stakeholders, where DRR is embedded in all relevant policy, planning, practice, attitudes and behaviour.

The following discussion will apply these ideas of disaster resilience through the context of the education to seek for the key factors decide the level of disaster educational resilience. The educational resilience, as pointed out in section 2.2.2, brings up the issues of educational governance and educational activities, which are considered as the two factors defining the level of educational resilience as well. Considering educational resilience from the standpoint of disaster resilience provides an interesting framework between these two different concepts, where identification of educational governance and educational practices for reducing risk are presented in each of different dimensions of resilience.

- The *technical dimension* which refer to school's capacity to recover back to its origin. In this study, techinical dimension should not be focused only on physical dimensions but also on resources such as human resources. School resilience is

defined as teachers' involvement in their jobs, peer cohesion (e.g., how supportive teachers are of each other), and supervisor support, or the extent to which the administration is supportive of teachers and encourages them to be supportive of each other.

- The *organizational dimension* could embrace admministrative and managemental functions related to disaster issues. Administrators or Managers can create a school environment that supports teachers' resilience, facilitate the nurturing environment in various ways to enhance students' resilience. They can demonstrate positive belief, set expectations and trust teachers, and provide ongoing opportunities for teachers to reflect, dialogue, and make decisions together (McLaughlin and Talbert 1993).

- The *social dimension* could be strengthened through creating an environment of caring personal relationships (Henderson and Milstein 1996). Krovetz (1999) similarly argues that to build resilient schools, teachers must make time to develop professional relationships with other school members. A key finding from the resilience research is that successful development and transformative power exist not necessarily in programmatic approaches but rather in deeper level relationships, beliefs, expectations, and a willingness to share power (Krovetz 1999). Schools need to develop caring relationships not only between educators and students but also between students, between educators, and between educators and parents (Benard 1997).

Interestingly, the oportunities to incorporate and harmonize these two components in different dimensions of resilience has transformed concepts into creative framework of educational disaster resilience. Such a framework could help educators design more effective educational interventions that take into account key factors that promote resiliency. The development and application of the framework will be discussed more in detailed in part 5.2.1 of Chapter 5.

2.3.3 Key factors of disaster educational resilience

While natural disaster cannot be avoided, its impacts to education can be reduced by strengthening educational resilience. Understanding on what factors contribute to the disaster educational reslience by means of assessing the strengths and effectiveness of educational governance and educational activities is therefore of tremendous importance. There are numerous factors defined as important attributes

that support educational resilience, which can be generally identified as personal factors and environmental factors (Garmezy, 1991; Rutter, 1987).

Personal factors are internal attributes and attitudes which the individual uses to buffer the adverse effects of their situation (Wayman 2002). Personal factors account for both students and teachers. Willingness to work hard, healthy self-concept, educational aspirations, and motivation are among the personal factors believed to be associated with educational resilience (Geary, 1988; McMillan & Reed, 1993; Wang, Haertel & Walberg, 1997). Optimism or positive attitudes have also been proved to be critical for educational resilience (Alva 1991, Alva and Padilla 1995). According to Waxman and Huang (1997), teachers' approaches and students' attitudes, actions, mannerisms are other crucial factors for educational resilience.

Environmental factors are external influences which provide support and protect against negative factors threatening resilience (Wayman 2002). For examples, dispositional attributes of the individual, affectional ties with the family, and external support systems in the environment family background (Werner and Smith 1977), family support, overall school satisfaction, and gang pressures (Reyes and Jason 1993); academic grades (Gonzalez and Padilla 1997); the influence of social resources such as parent, teacher, and school support (Nettles *et al.* 2000); the motivation and classroom learning environment (Waxman and Huang 1996); the physical environment of the classroom (Waxman and Huang 1997). School environments that are supportive and provide a positive place for the student to learn are immensely important to student resilence (Alva & Padilla, 1995; Finn and Rock, 1997; Wang et al.)

In addition to the positive factors enhancing educational resilience, many factors that have negative effects were pointed out. In the study of Read (1999), lack of parental involvement, low student motivation, and low self-esteem were responsible for the low resilience level.

Through theoretical and conceptual works in the areas of resilience, reducing risk impacts, strengthening avaible resources, improving organizational management and facilitating network among stakeholders were considered as effective strategies to building educational resilience. Rutter (1987), for example, suggested four ways to facilitate resiliency: reduce risk impacts and change students' exposure to risks, reduce negative chain reactions that often follow exposure to risks, improve students' self-efficacy or self-esteem, and open up or create new opportunities for students

(Rutter 1987). Masten (1994) similarly described four strategies for fostering resiliency, including reducing vulnerability and risk, reducing stressors, increasing available resources, and mobilizing protective processes. Swanson and Spencer (1991) has highlighted teacher training as one of important factors to address and reduce risks impacts on students (Swanson and Spencer 1991).

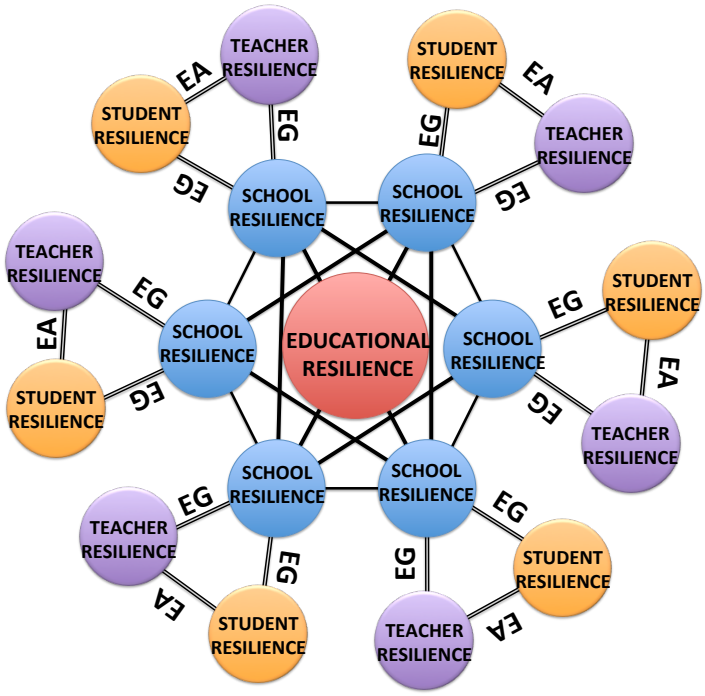


Figure 2.6. Framework for disaster educational resilience (EG= Educational Governance and EA= Educational activities)

In general, the scope of disaster educational resilience is considered as strategies and pratices to empower capacities of education sector in order to be resilient to disaster. Assessing educational disaster resilience, therefore, is to identify the strengths of particular school or education sector, in terms of resources (e.g. human resources, physical conditions), management issues, and networks (Figure 2.6). The utilization of these strengths and capabilities developing an assessment tool for evaluating disaster educational resilience will be described in more details later in the Chapter 5 of the thesis.

2.3.4 Differentiate between resilience and vulnerability

This part is an attempt to differentiate between the concept of resilience and vulnerability, as improper distinction may lead to confusion (Cutter et al., 2008). And confusion between these two concepts will possibly lead to inappropriate selection of resilience indicators, which will be applied in the main methodology of this research.

By looking at various definitions of resilience and vulnerability, the difference can be clearly pointed out. Resilience and vulnerability can be observed at different scales, but they are essentially relative concepts. While resilience is defined as ability of a system to get back its origin after shock (Twigg 2007, Cutter *et al.* 2010), vulnerability have a key role to play in estimating risk (Cutter 1996, Paton and Johnston 2001, Cutter *et al.* 2003). Paton and Johnston (2001) have distinguished resilience and vulnerability using their attributes. It is mentioned that those factors that contribute to susceptibility to loss will be defined as vulnerability factors, and those predicting adaptation and possibly growth will be defined as resilience factors (Paton and Johnston 2001). If resilience is considered as the ability of a system to resist, absorb, accommodate to, and recover from the effects of hazards (UNISDR 2009a), vulnerability is the absence of capacity to resist or absorb a disaster impact (Siembieda 2010), rather, it places stress on the production of nature to resist the force, stress, or shock resulting from a natural hazard (Manyena 2006). In addition, if consider from the time perspective, vulnerability is explained as "the pre-event, inherent characteristics or qualities of social systems that create the potential for harm" (Cutter *et al.* 2008). On the other hand, resilience focuses more on a system's response to an event (post-event), which is characterized by how the system can resist, absorb, or cope to it (Cutter *et al.* 2008).

Figure 2.7 Relationships between risk, resilience, and vulnerability (Paton 2005)

The study focuses primarily on reducing disaster risks, while a comprehensive understanding of risk will require recognition of the complementary role between risk and vulnerability (Paton 2005). The concept of resilience also helps further clarify the relationship between risk and vulnerability. If risk is defined as "the probability of an event or condition occurring" then it can be reduced through physical, social,

governmental, or economic means, thereby reducing the likelihood of damage and loss (Miletti 1999, Siembieda 2010). According to Paton (2005), hazard damage and loss cannot be understood in terms of the direct effects of the actions of the hazard reflect the interaction between hazard characteristics that increase susceptibility (vulnerability) and those that facilitate a capacity to adapt or adjust (resilience) (Figure 2.7). In this context, risk management can be described in terms of the choices made regarding the reduction of vulnerability and the development of resilience or adaptive capacity.

2.4 Disaster risk reduction education

2.4.1 Definition of DRRE

"Disaster education", "disaster risk education", and "disaster prevention education" are interchangeable terms describing the expressions of education for DRR (Shaw et al., 2011). In this study, the term "Disaster Risk Reduction Education" (DRRE) has been taken as primary.

During 1990s, the UN International Decade of Natural Disaster Reduction called for measures to be taken at each national level in terms of disaster risk reduction with a focus on the roles of education as "to take measures, as appropriate, to increase public awareness of damage risk probabilities and of the significance of preparedness, prevention, relief and short-term recovery activities with respect to natural disasters and to enhance community preparedness through education, training and other means, taking into account the specific role of the news media" (UN 1989)

OECD (2008) has defined risk awareness education encompasses understanding natural and biological mechanisms that may create hazards and the human vulnerability to these hazards.

According to UNISDR (2009):

> *DRRE is sharing and using information and knowledge in a productive way through awareness-raising and educational initiatives so that people make informed decisions and take action to ensure their resilience to disasters. It encompasses far more than formal education at schools and universities, and involves the recognition and use of traditional wisdom and local knowledge for protection from natural hazards (UNISDR 2009b).*

Also, DRRE is defined as activities takes into account the relationships between society, environment, economy, and culture and their impacts. It also promotes critical thinking and problem solving as well as social and emotional life skills that are essential to the empowerment of groups threatened or affected by disasters (UNESCO, 2012)

The objective of DRRE has been defined by UNESCO as to:

- To seek political commitment in integrating disaster risk reduction (DRR) into education curricula, school construction and education sector plans and allocated budget/funds for it
- To promote the integration of DRR into non-formal education and extra-curricular activities and recognize the importance of traditional and indigenous knowledge
- To highlight the role and contribution of local communities, in particular women, as well as local authorities and implementing partners (NG0s, national societies) in the educational process
- To recognize the special needs of vulnerable groups including disabled children
- To identify good practices and identify national "champions" in integrating disaster risk reduction into school curricula and in developing school safety programs

2.4.2 Evolution of DRRE and the HFA through the lens of education

The importance of education in DRR has been emphasized in several international agendas, frameworks, conferences, UN programs, as well as others. Chapter 36 of Agenda 21, on 'Education, Awareness and Training' stated 'Education, including formal education, public awareness and training, should be recognized as a process by which human beings and societies can reach their fullest potential' (UNEP, 1992). The theme of "Disaster Reduction, Education and Youth" was introduced during the UN World Disaster Reduction Campaign in 2000 (UN 2000). This priority has become integral to the 2005-2015 Hyogo Framework for Action as part of Priority 3, focusing on the "use of knowledge, innovation and education to build a culture of safety and resilience at all levels" (UNISDR 2005). At the World Conference on Disaster Reduction in Kobe, Japan, in 2005, the international community signed up to the HFA as 10 year DRR strategy. The HFA sets out three strategic goals and outlines

five priorities for action, which cover the main areas of DRR. It also suggests important areas for intervention within each theme (see Table 2.1).

The adoption of the HFA also provides a global linkage and follows the United Nations 1990s' International Decade for Natural Disaster Reduction efforts. It proposed measurement of resilience is determined by "the degree to which the social system is capable of organizing itself to increase this capacity for learning from past disasters for better future protection and to improve risk reduction measures." While very broad, this definition contains two key concepts: 1) adaptation, and 2) maintaining acceptable levels of functioning and structure. While adaptation requires certain capacities, maintaining acceptable levels of functioning and structure requires resources, forethought, and normative action. Some of these attributes are now reflected in the 2010 National Disaster Recovery Framework published by the U.S. Federal Emergency Management Agency (FEMA) (Siembieda 2010).

In 2006, the UNISDR campaign "Disaster risk reduction begins at school" aiming to promote the integration of DRR into government plans for school curricula and to ensure that school buildings are safe from the impacts of natural hazards (UNISDR 2006, Wisner 2006). Activists connected with non-governmental organizations and scientific, academic and research institutions have worked with dedication to bringing this priority to life at both grassroots and policy levels. The Second Asian Ministerial Conference on Disaster Risk Reduction (2007, India) urged governments to make school safety and the integration of disaster risk reduction into school curricula a priority on the national agenda (UN/ISDR, 2007a). The Third Asian Ministerial Conference on Disaster Risk Reduction (2008, Malaysia) recognized education as an essential contribution to effective implementation of disaster risk reduction and concrete impact tin terms of shifts in behaviors art the local level, where communities are most vulnerable to disasters (UN/ISDR, 2008). Last but not least, the UNESCO Education for Sustainable Development (ESD) program emphasized that 'Education is the primary agent of transformation towards sustainable development, increasing people's capacities to transform their visions for society into reality' (UNESCO, 2005).

The steps for that are good governance, use of risk knowledge to develop effective early warning systems, awareness raising and education, changing practices and conditions that aggravate risk, and disaster preparedness through contingency plans, emergency funds, and simulation exercises. In regards to awareness raising and

education, the HFA addresses, through its Priority 3, the following measures as relevant and necessary to accomplish its goal:

(i) Inclusion of DRR knowledge is relevant in the school curricula at all levels and the use of other formal and informal channels to reach youth and children with information;

(ii) Implementation of local risk assessment and disaster preparedness programs in schools and institutions of higher education;

(iii) Implementation of programs and activities in schools for learning how to minimize the effects of hazards;

(iv) Development of training and learning programs in DRR targeted at specific sectors (development planners, emergency managers, local government officials, etc.);

(v) Promotion of community-based training initiatives, considering the role of volunteers, as appropriate, to enhance local capacities to mitigate and cope with disasters;

(vi) Ensure equal access to appropriate training and educational opportunities for women and vulnerable constituencies; promote gender and cultural sensitivity training as integral components of education and training for DRR.

A look into HFA from the lens of education E-HFA

In order to find out an effective way to approach DRRE, Gwee (2011) has proposed 16 tasks base on their relevance to the education. These 16 tasks are considered as one between two frameworks that will be used in the research to develop the educational disaster resilience assessment tool. The research studied an integrated approach, which helps to both incorporating DRR into school curriculum and into the education sector as a whole (Gwee 2011). The approach considered education curricula and safe school buildings as critical and also addressed legislative measures such as having formal guidelines for implementation and funding) proper early warning systems and risk assessments, training of qualified professionals, promoting community involvement as well as measures taken to prepare community in responding to disasters. As from the description of the HFA in session 2.2.2 that the HFA set out five Priorities for DRR actions and 22 tasks that are expected to help central as well as local stakeholders in the implementation of HFA. Among the 22 tasks, Gwee (2011) has identified and modified the tasks to fit the educational context, and is considered as E-HFA (Education in Hyogo Framework for action).

Table 2.4 Proposed 16 Tasks relevant to the Education sector

Priority 1: Developing institutional base for disaster risk reduction in education
1. Engage in multi-stakeholder dialogue to establish the foundation for disaster education.
2. Create or strengthen mechanism for systematic coordination for disaster education.
3. Assess and develop the institutional basis for disaster education.
4. Prioritize disaster risk reduction and allocate appropriate resources for disaster education.
Priority 2: Identifying, assessing and monitoring disaster risks in the education sector
5. Establish risk assessments for the education sector
6. Strengthen early warning in the education sector through effective communication and dissemination mechanism.
Priority 3: Building a culture of safety through disaster education
7. Develop public program to raise awareness of disaster risk reduction
8. Include disaster risk reduction in the education system
9. Develop disaster risk reduction training and learning at community level
10. Enhance dissemination of disaster risk reduction information
Priority 4: Reducing the underlying risk factors in the education sector
11. Environment: Understand sustainable ecosystem, environmental and natural resources management
12. Establish measures to incorporate disaster risk reduction in urban and land-use planning
13. Structures: Strengthen mechanisms for improved building safety and protection of critical facilities in the education sector
14. Disaster recovery: Develop a recovery planning process that incorporates disaster risk reduction
Priority 5: Preparing for effective emergency response and recovery in education
15. Build on disaster preparedness capacities and mechanisms in the education sector
16. Assess disaster response preparedness capacities and mechanisms through strengthened planning

Source: (Gwee 2011)

As an important result of the research, 16 tasks for application of HFA into the education sector have been suggested (Table 2.4). For each of tasks, a number of suggestions were given at community (or school level), local level and national level as well.

2.4.3 Formal, non-formal, and informal DRRE

In both educational literature and studies of disaster education, there is a consensus on the classification of DRRE including three different types: formal, non-formal and information education (Coombs and Ahmed 1974, La Belle 1982, Dib 1988, Eshach 2007, Petal 2008, 2009, Shaw *et al.* 2011, Fernandez 2012). Although there are various alternative education systems such as "open systems", "non-formal education", "distance learning", "non-conventional studies", among others, there is no agreement as to their meanings, making it impossible to reach a consensus for their concepts (Dib 1988). Eshach (2007) also agreed that non-formal education, informal education, out-school learning, distance learning, or non-conventional studies are analogues (Eshach 2007).

In 1974, Coombs and Ahmed equate education with learning and identify three types of education including formal, non-formal, and informal education (Coombs and Ahmed 1974). Currently, there is no consensus on the definitions for each forms of education, especially for non-formal education. As remarked by Ward et. al. (1974) "a comprehensive and standard definition of non-formal education is not yet available in common usage. Perhaps such a definition will not emerge until after much more study of the educational issues and potentialities inherent in the variety of experiences now called non-formal education has been done" (Ward *et al.* 1974). In some cases, non-formal education is viewed as an median between formal and informal education (La Belle 1982).

This part will analyze the different concepts of formal, non-formal and informal education in order to have better understanding their features, advantages, limitations and interrelations and also to define utilization of these modes in the DRRE practice.

2.4.3.1 Definitions of formal, non-formal and informal education

One of the first definitions of different modes education was that developed by the International Standard Classification of Education (ISCED) in 1997. However, the system was only focus on formal and non-formal education, the informal learning has not yet mentioned. The International Standard Classification of Education (ISCED) (1997) introduced the definitions of formal and non-formal education as the following (UNESCO 1997):

Formal education is the type of education provided in the system of schools, colleges, universities, and other formal educational institutions that normally

constitutes a 5 to 25 year continuous ‘‘ladder’’ of full-time education for children and young people. This varies depend on the country context, particular the upper parts of this ‘‘ladder’’ are constituted by organized programs of joint part-time employment and part-time participation in the regular school and university system, which was so-called as the ‘‘dual system’’ or equivalent terms in these countries.

Non-formal education is any organized and sustained educational activities that do not correspond exactly to the defined formal education. The location of non-formal education can be both within and outside educational institutions, and cater to persons from the young to the elders. Similar to formal education, non-formal education’s characters also depend on country contexts, it may cover educational programs to impart adult literacy, basic education for out-of-school children, life skills, work skills, and general culture. This mode of education does not necessarily follow the ‘‘ladder’’ system, and may vary in duration.

The ISCED system differentiates between the two types of education mainly base on the time of participation, educational duration or structural programs, not yet mentioned to the variation from teachers and students’ standpoints.

Another glossary of formal, informal and non-formal education that has been recognized internationally were those proposed, revised and updated by the Office for Official Publications of the European Communities (Cefedop) almost annually since 2004. However, reviewing the definitions of these terms show that they basically remain the same from the version of 2004 through the newest version in 2011. The description of each mode of education is presented as the following (Tissot and Cedefop 2004):

Formal education is described as education, which is typically provided by an education or training institution, structured (in terms of learning objectives, learning time or learning support) and leading to certification, and intentional (from the learner’s perspective).

Non-formal education is learning which is embedded in planned activities not explicitly designated as learning (in terms of learning objectives, learning time or learning support), but which contain an important learning element. Non-formal learning is intentional from the learner’s point of view. It typically does not lead to certification.

Informal learning can be defined as learning resulting from daily work-related, family or leisure activities. It is not organized or structured (in terms of objectives,

time or learning support). Informal learning is in most cases unintentional from the learner's perspective. It typically does not lead to certification. The sums of activities that comprise the time individuals are not in the formal classroom in the presence of a teacher.

The key differences of the three modes proposed by Tissot and Cefadop (2004) can be explained clearly through three attributes, namely *designated as learning* (as of unique for formal education), *not explicitly designated as learning* (as of unique for non-formal education), and *not organized or structured* (as of unique for informal education). In addition to the structural program, the divergences of other issues such as the learner's point of views, the evaluation, or certification were taken into account.

Table 2.5 provides some examples on the definitions of formal, non-formal and informal education. Aside from these two examples that analyzed before, there were numerous researches carried out in attempt to seek for the clarification of formal, non-formal and informal education. One example can be seen in the study of the life long learning by Coombs and Ahmed (1974), who defined **formal education** as the institutionalized, chronologically graded, and hierarchically structured educational system, spanning from primary school to the university, **non-formal education** as any organized, systematic, educational activity carried on outside the framework of the formal system to provide selected types of learning to particular subgroups in the population, adults as well as children, and **informal education** as the lifelong process by which every person acquires and accumulates knowledge, skills, attitudes and insights from daily experiences and exposure to the environment (Coombs and Ahmed 1974). Another explanation on formal, non-formal and informal education was created by Dib (1988) on the quest for the application of these three modes in practice. The research has identified the style of **formal education** is to correspond to a systematic, organized education model, structured and administered according to a given set of laws and norms, presenting a rather rigid curriculum as regards objectives, content and methodology; of **non-formal education** is to adopt strategy and does not require student attendance, decreasing the contacts between teacher and student, and most activities take place outside the institution; and of **informal education** is not to correspond with an organized and systematic view of education; informal education does not necessarily include the objectives and subjects usually encompassed by the traditional curricula. It is aimed at students as much as at the

public at large and imposes no obligations whatever their nature formal education (Dib 1988).

2.4.3.2 The similarities and differences between the three modes of education

As education is a cultural issues and is very much rooted in the local context (Bonifacio 2010), it is a challenge to reach to a consensus on different modes of education. Consequently, variation between the definitions of each type, and among different types are significant. The less variation is of formal education, which often set up with the highest consistency, structured and certified program (Figure 2.8). A major difference between formal and non-formal education rest with the influence of the government on the sponsorship of the two types of education programs (La Belle 1981). In the same study, the difference between non-formal and informal education has been pointed out with the deliberation instructional and programmatic emphases present in non-formal education but absent in informal education (La Belle 1982). Non-formal education typically involves workshops, community courses, interest based courses, short courses, or conference style seminars. The learning takes place in a formal setting such as an educational organization, but is not formally recognized within a curriculum or syllabus framework (Cedefop 2008). Informal education is not structured and usually does not lead to certification. Informal education often applied in life long learning by which every person acquires and accumulates knowledge, skills, attitudes and insights from daily experiences and exposure to the environment (Coombs and Ahmed 1974).

In some cases, non-formal education has being used as alternative for formal education in addressing societal problems involving health, nutrition, unemployment, food production, and so on. In these instances, non-formal education often assisted in bringing educational services to a rapidly growing population that could not be adequately addressed through schools that had to be built, equipped and staffed through a complex economic, managerial and political bureaucracy (La Belle 1982). Besides, non-formal education, starting from the basic needs of students, is concerned with the establishment of strategies that are compatible with reality (Dib 1988). As so, non-formal education has the potential to play as an approach in DRRE aside from the concreted or integrated formal education approach.

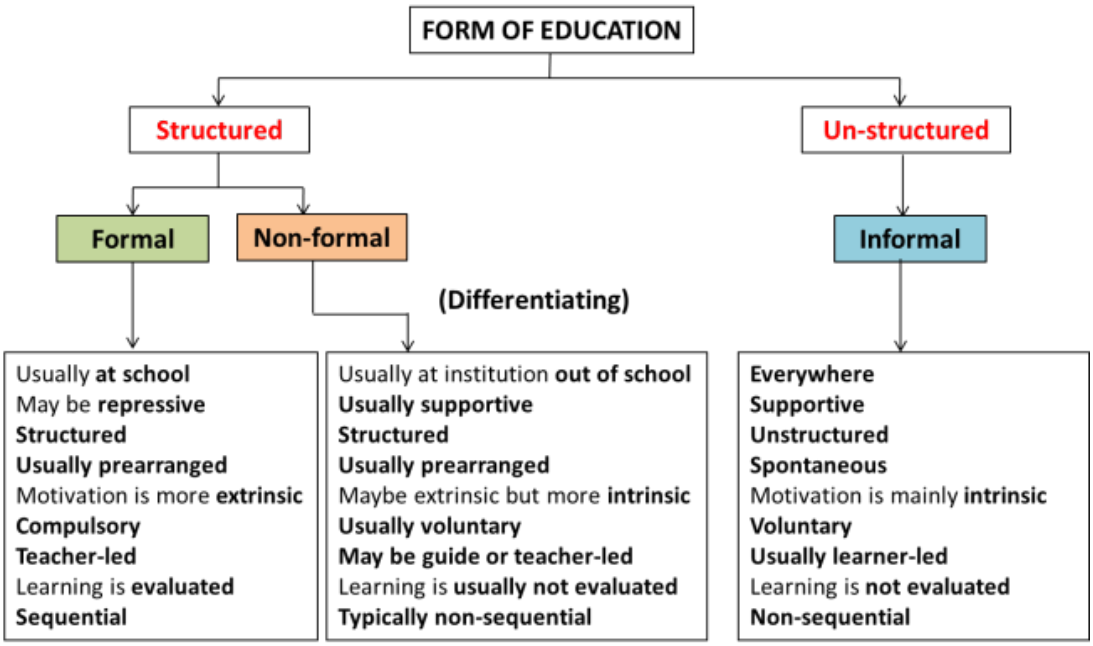


Figure 2.8 Definitions and key characteristics between formal, non-formal and information education (Source: adopted from EDE group working, IEDM lab, 2010)

However, in practice, formal, non-formal and informal education should not be viewed separately or in distinguished with each other but rather as predominant modes of learning again other (La Belle 1982). It is essential to understand how the practices of these concepts can supplement each other to advance the education and learning in a sustained manner. In the study of non-formal education and social change in Latin America, La Belle (1976) has proposed a model, which brings simultaneously three modes of education together to minimize every disadvantage of each mode using others' advantage (Figure 2.9). The model reflects the dominant type of learning process that is occurring from the perspective of the learner and the characteristics of the educational types. It focuses on the structure rather than the process of education. Formal educational characteristics reflect hierarchical ordering, compulsory attendance, admissions requirements, standardized curricula, prerequisites, and certificates. Non-formal educational characteristics indicate that the activity must be separate from state-sanctioned schooling yet be preplanned and systematic and be able to lead a particular group of learners toward some specific goals. And informal educational characteristics reflect the contact individuals have with a variety of environmental influences that result in day-to-day learning (La Belle 1981).

Table 2.5 Concepts of formal, non-formal and information education

Author	Formal	Non-formal	Informal
(Coombs and Ahmed 1974, Norland 2005)	Formal education is defined as the **institutionalized**, chronologically **graded**, and hierarchically **structured** educational system, spanning from primary school to the university	Non-formal education is any **organized**, **systematic**, educational activity carried on **outside the framework of the formal system** to provide selected types of learning to particular subgroups in the population, adults as well as children	Informal education is the **lifelong process** by which every person acquires and accumulates knowledge, skills, attitudes and insights from **daily experiences and exposure** to the environment
(Dib 1988)	Formal education corresponds to a **systematic**, **organized** education model, **structured** and **administered** according to a given set of laws and norms, presenting a rather rigid **curriculum** as regards objectives, content and methodology.	Non-formal education adopts strategy, which **does not require student attendance,** decreasing the contacts between teacher and student, and most activities take place **outside the institution**. Educative processes endowed with **flexible curricula** and methodology, capable of adapting to the needs and interests of students, for which time is **not a pre-established** factor but is contingent upon the student's work pace, certainly do not correspond to those comprised by formal education.	Informal education does **not correspond to an organized and systematic** view of education; informal education does not necessarily include the objectives and subjects usually encompassed by the traditional curricula. It is aimed at students as much as at the public at large and imposes no obligations whatever their nature formal education
(ISCED,1997)	Normally constitutes **a continuous ''ladder''** of full-time education Generally **full-time education** Cater mainly to **aged 5–25 years** May be in the form of **organized** programs of joint **part-time employment and part-time participation** in the regular school and university system	**Do not necessarily follow the ''ladder''** system May have **differing duration** Cater to **all ages** Educational programs are country and local- context based In any organized and sustained educational activities, both **within and out** of educational institutions	
(Tissot and Cedefop 2004)	Learning that occurs in an **organized** and **structured** environment (e.g. in an education or training institution or on the job) and is **explicitly designated** as learning (in terms of objectives, time or resources). Formal learning is **intentional** from the learner's point of view. It typically leads to **validation** and **certification**.	Learning which is embedded in planned activities **not explicitly** designated as learning (in terms of learning objectives, learning time or learning support). Non-formal learning is **intentional** from the learner's point of view.	Learning resulting from **daily activities** related to work, family or leisure. It is **not organized or structured** in terms of objectives, time or learning support. Informal learning is in most cases **unintentional** from the learner's perspective.
(European Commission 2012)	Formal learning takes place in an **organized** and **structured** environment, specifically dedicated to learning, and typically leads to the award of a qualification, usually in the form of a certificate or a diploma.	Non-formal learning **outside the formal school/vocational training/university syste**m, taking place through **planned activities** (e.g. with goals and timelines) involving some form of **learning support**	Informal learning is **not organized or structured** in terms of goals, time or instruction. This covers skills acquired (sometimes unintentionally) through **life and work experience**

Source: adopted from (Shaw *et al.* 2011)

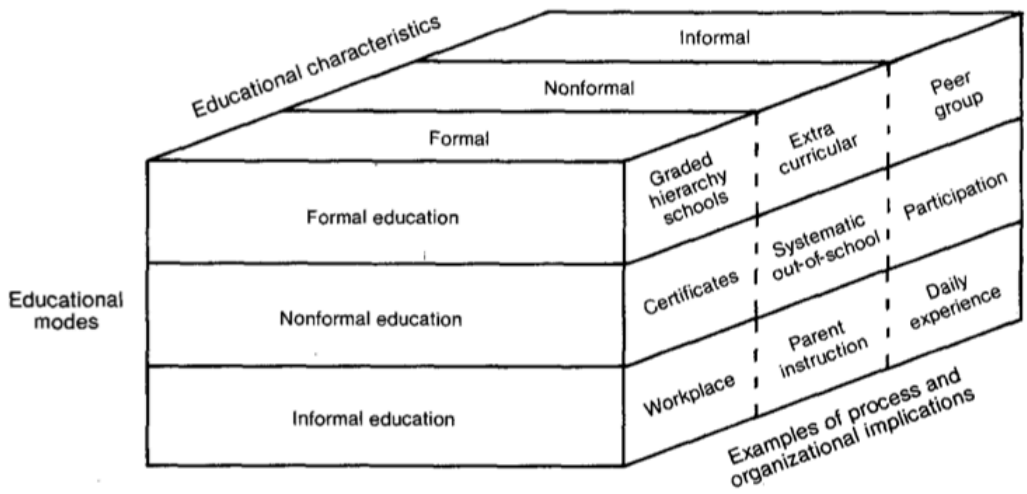


Figure 2.9. Modes and characteristics of education (Source: (La Belle 1982)

Recently, results from various studies proved that different modes of education which plays a key role in general education, lifelong learning and fundamental of education for all, among others, was also found relevant for DRRE (Coule *et al.* 2007, Petal 2008, 2009, Shaw *et al.* 2009, Cabasal 2010, Gwee *et al.* 2011, Shaw *et al.* 2011, Fernandez 2012). On the quest for effective approaches to implement DRRE in practice, the role of formal, non-formal and informal education, as well as the interaction between the three modes in both communities or school based approach will be considered.

2.4.4 Approaches to disaster risk reduction education

Damages of disasters at local level has called for increasing numbers of agenda, frameworks and programs have been implemented which mainly focus on DRR education at school and community level. The issue on how to bring knowledge to actions, as well as to link school to community has resulted in the employment of different models of DRR education (Figure 2.10). Some of these are primarily school-based and others are primarily community-based, with many opportunities overlapping (Twigg, 2004; Petal, 2009). While community education is often considered as the foundation for later disaster mitigation developments (Stoltman *et al.* 2004), school education is taken as the first step for bringing DRR into the education. Community education is important as sources of supports and local experiences on DRR (Takeuchi *et al.* 2011), while school education provide useful information as the knowledge base for DRR (Shaw *et al.* 2004).

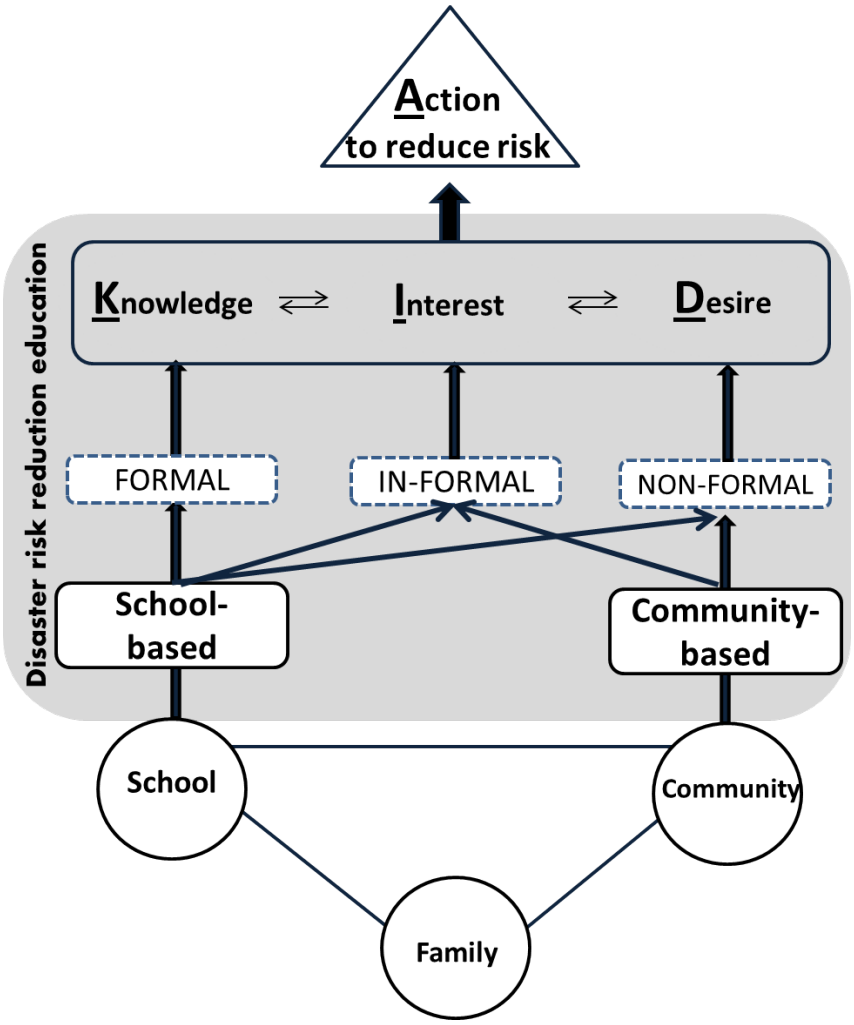


Figure 2.10 Approach to education for disaster risk reduction

The prominence of school-based approach is viewed as advantageous over community education for such factors as continuity, sustained, and follow-up (Geert ten Dam T. M. and Blom 2006, Buitink 2009). The efforts of DRRE in school are often systematically implemented with a long-term planning and capacity building. Although communities may be able to establish some types of education, they often struggle to maintain or enhance those efforts without any outside assistance (Nicolai 2003). Besides, as it lacks of academic environment, community education's standard may be inadequate to meet children's essential needs. The importance of school-based approach is also highlighted in the particular case of students with special needs (Obi, 2010). In sum, it would appear that in many cases, school-based education has a more appropriate context to promote DRRE, in particular for the beginning steps in practicing DRRE.

2.4.4.1 Community-based DRRE

Education, when it is confined to community, is the sharing of local experiences within and among communities. As local communities are on the frontlines of both the immediate impact of a disaster and the initial response, sharing that valuable experience is crucial for saving the most lives. As such, community education opens a lot of opportunities for the learners to listen and learn from the grassroots. In this way, DRRE can be built upon examples of risk reduction that have been tried and tested in the adversity of local experience. According to Petal et al. (2008) community-based activities can embedded and integrated culture of safety and DRR into ideas, policies, practices, and daily life ~~(Petal *et al.* 2008)~~. Example of community education can be seen through numerous community-based disaster risk reduction program. 'Community radio for disasters' program is one among other (Hibino *et al.* 2012). This program aims to provide information for local people by using radio system as prime vehicle for information sharing for communities during disaster emergency relief as well as post disaster recovery. Community radio also plays an important role in disaster risk reduction, especially in pre-disaster preparedness and mitigation through awareness raising that targets different community groups.

In Vietnam, the Government has made priorities for community-based programs and projects on natural disaster prevention, response and mitigation since the year 2000. The community-based approach in Vietnam has been contributing to DRRE as means of providing knowledge and raising awareness for local people to response to natural disasters. There are some community-based DRR projects in Vietnam have targeted awareness-raising on disaster preparedness among children who are not attending school. The main objectives of these programs is to teach children to prepare risk maps, locate evacuation areas, protect themselves from drowning, help other children, and communicate disaster preparedness to other community members. More details of these programs will be described in Chapter 3, part 4.3 "DRRE initiatives in Vietnam". However, studies on disaster management show that top-down approach in community-based activities failed to meet the actual needs of the vulnerable people, ignored the potential of local resources and may even increase communities' vulnerability (Van Staden *et al.* 2006). Human resource constraint is another issue of community-based activities in Vietnam. Most of the people who participate in the community-based activities are the local officers with official duties. Even if there is staff available for the tasks, their capacity may not meet the

requirements for application of community-based approach in DRRE (Tong *et al.* 2012). In general, limited capacity and Insufficient participation of community has hindered it from being a potential entry point for DRRE in Vietnam. Furthermore, according to Shaw (2006), most community-based projects in Vietnam face the main challenge of sustainability after the completion (Shaw 2006).

In addition to Vietnam, among ASEAN Member States, Thailand and Philippines also carried out community-based DRRE under different forms (Reyes *et al.* 2011). For examples, in Thailand, youth campus on disaster prevention and mitigation is held annually to train children about hazard and risk mapping, first-aid, rescue and emergency response, and participate in drills, among others, an annual youth camp. In the Philippines, DRR has been integrated in the non-formal curriculum known as alternative learning under the Bureau of Alternative Learning Systems (BALS) of Department of Education. The focus of the non-formal education is out-of-school youth and students taking up technical and vocational courses on agriculture and fishery. Moreover, DRR concepts have also been integrated in the environment textbook used for non-formal education. The textbook has been approved by Department of Education and printed out for use by students taking up non-formal or alternative learning education (Reyes *et al.* 2011, Fernandez 2012).

2.4.4.2 School-based DRRE

The important role of school-based approach to promote DRRE in practice has been highlighted both in academic researches and international dialogue, programs, and agenda. Firstly, according to UN International Strategy for Disaster Reduction (UNISDR), ‘‘Schools are the best venues for forging durable collective values; therefore, they are suitable for building a culture of prevention and disaster resilience’’ (UNISDR 2006). School DRRE, in a more comprehensive way, requires strong national political will, a systematic approach and sustained actions” (UNISDR 2011). Education services increasingly reach a greater percentage of elementary and junior secondary school aged each year. For instance, in the developing countries, the elementary age children are the first in their families to attend school, and more often the only ones in their families and communities to attend school beyond the initial one or two years. Also, in less developed countries, the first generation to fully complete elementary schooling is emerging in the population. Elementary, junior, and senior secondary students are among the best diffusion agents for information about natural

disaster event, taking the information home and teaching it to parents and extended family (Stoltman, Lidstone, & DeChano, 2004a).

Secondly, the integration of DRR education through school is considered as one of the best way to ensure that DRR messages reach into every family and community. In this way, the goal of developing 'disaster-resilient communities' depends heavily on the success of DRR education. Shiwaku (2011) also agreed that a school-based approach has the potential to address the importance of linking school education with family and community education as it engages students and teachers in a more proactive partnership with the neighborhood. In this way, learning of DRR is bequeathed to future generations in a sustainable manner (Shaw et al., 2009).

Thirdly, as shown in the Figure 2.10, the integration of formal, non-formal and informal education through school is proved to ensure that *knowledge* together with *interest* and *desire* can lead to actual *action* (KIDA model) (Shaw et al., 2009). The important role of school to provide the skills, opportunities, and relationships that promote resiliency has been confirmed in many studies (Storer *et al.* 1995, Henderson and Milstein 1996, Krovetz 1999, Waxman *et al.* 2004). It also helps to encourage the actual implementation, brings more new ideas, and produces the desired effect in time of disasters. Schools contribute to awareness raising on DRR through two main ways, by provision of correct information to the students about disasters, its causes and effects, and of practical training on how to protect oneself (Shaw *et al.* 2004).

2.4.4.2.1 DRRE at primay education

The important role of primary education has been emphasized in national and international achievement, and access to it is formally accepted as human right (UN, 1948). The contribution of primary education into development has been stressed in a Japanese white paper "Japan's growth and education 1963" that the diffusion of elementary education raised the quality of the people's skills, modernized their thought, and made it possible for them to participate successfully in modern economic activities (MEXT, 1963). The World Development Report 2000/2001 has highlighted the role of primary education essential in poverty alleviation (World Bank, 2004). Besides, universal primary education was set as one among eights international development goals in the Millennium Summit of the United Nations in 2000, following the adoption of the United Nations Millennium Declaration. Since then, significant progress has been made in primary enrolment and attendance in most of

the countries in the Middle East/North Africa, East Asia and the Pacific and Latin America and Caribbean regions. This creates a great favorable condition for the implementation of DRRE at primary level. The integration of DRR into primary education will help to attract more attention and investment in primary education, which in turn contribute significantly to the MDG of universal primary education.

In addition, primary education itself has three important incentives for the implementation of DRRE: (i) motivation towards DRRE. Primary schooling motivates a kid towards different types of learning, thus improves their interest to firmly proceed forward DRRE; (ii) develop basic and important skills for DRR. Primary education provides primary age children with basic skills on communication, critical thinking, decision-making, coping and self-management skills. These factors are also considered as important factors contributing to build resilience for students in early adolescence (Waxman 2003); (iii) develop social responsibility, one of the most important components of DRRE. Primary education gives children the first chance to be a social being, let them primarily understand about social responsibility through different social activities, such as dealing with aged people, nature of cooperation or sharing perspective, responsibility towards nature and plenty of additional attributes.

2.4.4.2.2 Principles for school-based DRRE

- The perspective of school-based DRR does not mean that every activity will be held by the school or in a school building. It may occur in several places and involve different stakeholders as long as the leading role is taken by a functioning group in the school (Tong, 2013).

- School DRRE should include every single stakeholder who may be affected by disaster in his or her lifetime, and anyone whose opinions and decisions affect others (Petal 2009).

- For school-based DRRE, education and training programs should be designed in such a way that they are sustainable and continuous processes as the target population continuously changes and grows (SEEDS India 2008).

- School DRRE should be considered as a key pillar of public DRRE to enhance community disaster resilience, gain support for school-led activities, and motivate local resources for risk mitigation and planning in school (APEC 2009).

In addition, the basic principles for DRRE in school was defined by Bonifacio (2010) including three aspects (Bonifacio *et al.* 2010):

(i) School disaster education should go beyond the school boundaries and should include family and community education to make decisive proactive actions.

(ii) School disaster education should be participatory; action oriented, and should not be restricted to classroom lectures.

(iii) Teachers can play the role of key change agents in school disaster education, and therefore, proper teachers' training is an essential component.

2.4.4.2.3 Contents of school-based DRRE

As from the session 2.3 in this Chapter, improvement of school resilience has to focus on two parts: educational governance and educational activities. A school-based DRRE, therefore, have to cover two areas: school management on DRR and teaching and learning activities on DRR (or the integration of DRR in curricular and extra-curricular).

Educational governance on DRR

When considering disaster education, it should not only be limited to the education curricula, but should include the relating issues such as structural and non-structural safety, legislative measures supporting the integration, implementation as well as sufficient funding, proper early warning systems and risk assessments, training of qualified professionals etc. (Gwee *et al.* 2011). Structural safety such as improvement of the building design and construction need to be considered. Besides, safer construction of school buildings needs to be ensured in a way that school buildings will be able to provide public shelter after a disaster (Center for Disaster Preparedness, 2008). UNESCO (2009) has highlighted the important of a safe education facility as "that which is either located in a danger-free zone or has been built to be resilient to an extreme natural event". Also, educational facilities and equipment can be utilized to made school resilient through proper use and regular reinforcement. Regard to the policy development and advocacy for DRRE, existing institutional establishment need to be strengthened and DRR needs to be integrated in both policies and programs of national education system and to other sectoral ministries and departments in order to ensure access to resources and capacity building, to coordinate the different DRR activities and increase efficiency and more importantly, support in times of emergencies (Center for Disaster Preparedness, 2008). Simultaneously, changing school policies and practices in the aftermath of a disaster is needed for a quick recovery, limit educational interruption, ensure

continuity at the same time taking action to improve school safety and prepare for the next disaster have the possibility to bring about a meaning full DRR in schools.

Educational activities on DRR

A report from APEC Emergency Management Senior Disaster Officials Forum held in Hanoi on 15-17 September 2009 with focus on Disaster risk education at schools has identified the following activities for disaster risk education programs:

- Preparedness conversion: Learning how to commence and maintain preparations for natural disasters.
- Mitigation behaviors: Learning what to do before, during and after a natural disaster.
- Adaptive capability: Learning how to change and maintain systems, networks and build community competencies (e.g. skills, leadership) to minimize the impacts of natural disasters.
- Post-disaster learning: Learning how to improve preparedness conversion, mitigation behaviors, and adaptive capability after a natural disaster

Regard to the curriculum, the curriculum on DRR should include the following topics: the nature and types of related hazards; natural and man-made disasters and need for their management; efforts made in various regions for disaster preparedness; role of community and schools in disaster reduction; partnership with various government and nongovernment agencies; use of modern and scientific technologies to combat disasters and survival skills (Bonifacio 2010).

In sum, schools should teach about all stages of the disaster risk reduction cycle, therefore education materials should introduce students to disaster prevention, mitigation, preparedness as well as response and recovery. Besides, DRRE in school should introduce students to land use planning, building codes, insurance and environmental stewardship, where applicable as means of managing and reducing disaster risk. It is important to have materials with supplement a range of academic subjects, which root in existing learning materials, fit the local context, and should be culturally sensitive taking into account indigenous and traditional knowledge (APEC 2009).

In order to ensure the effectiveness of teaching and learning on DRR in schools, it is important to applied appropriate approach for the integration of DRR into curricular

and extra-curricular, which fits the school teachers and school students' teaching and learning style and capacity.

2.4.4.2.4 Approach for the integration of DRR into curricular, cross curricular and extra-curricular

According to (Reyes *et al.* 2011), there are 38 countries reported that they had disaster-related subjects taught formally in their national school curriculum. DRRE can be integrated through a limited number of carrier subject areas such as science, social studies and health, or infused throughout the whole curriculum. Sometimes a mix of approaches is used. Each of the being used approaches have advantages and disadvantages. Integration into carrier subjects can facilitate teacher training and improve oversight of the covered issues. Infusion throughout the curriculum may be more efficient if the education system is structured well and of higher quality. For resource-poor settings and beginner programs, the carrier subject approach is recommended (UNICEF 2013). It is worth to note that the concept of each approach to integrate DRR into curriculum will be not the same when apply to the specific context of the country. The national curriculum development process may vary from country to country, but in general, the process involves the following major steps: needs assessment and planning, content development, and pilot delivery and revision (Reyes *et al.* 2011).

In a report of 30 case studies in DRRE by UNESCO (2012), there are different approaches being used to bring DRR into the curricular and extra-curricular, these are (UNESCO and UNICEF 2012):

- The textbook-driven approach: this approach usually involves the curriculum arm of the Ministry of Education, often working in conjunction with national and international non-governmental organizations, in revising textbooks of particular subjects to include, or broaden the pre-existing treatment of, hazard-related or disaster-related topics.

- The pilot project approach: this approach usually combines the production of new, often multi-media, learning materials, the development of training manuals developing new pedagogies and innovative forms of assessment, and the training of instructors.

- The centralized competency-based approach: this approach begins with a central governmental body, usually working in conjunction with key stakeholders, identifying

core messages of DRR, key concepts, key knowledge and, especially, key competencies and skills to be built into the curriculum.

- The centrally developed special subject (dedicated space) approach: this approach creates a new stand-alone subject dedicated entirely to or allotting significant curricula space for disaster risk reduction learning within the formal curriculum. Key messages and skills of disaster risk reduction are core or pertinent to the subject.

- The symbiosis approach: this approach to disaster-related curriculum integration relies upon the 'family resemblance' between DRR and other cross-curricular initiatives concerned with developing social awareness and empowering the individual for active citizenship that are already mainstreamed.

- The 'special event' approach: recalling the cautionary note concerning the co-curricular approaches given in the previous section, special DRR events can have a catalytic and galvanizing influence on formal curriculum development.

2.5 Key findings

The discussion presented above suggests that it is feasible to develop strategies and planning for a proper DRRE toward the improvement of educational resilience to disasters. In doing so, the study focused on examination of disaster educational resilience with respect to its origin from educational resilience, the interaction between educational governance and educational activities with actions to reducing risks.

It is important to note that the educational resilience to disaster cannot be fully achieved, as if it is, then education sector is free of risks. It may be helpful to think about educational resilience as a measure of which, by enhancing its level, educators can expect a great increase of educational capacity to withstand natural hazards.

Although as proposed by Shaw et al. (2004) that school disaster education has two main parts: education from teachers about disaster related issues, and proactive education with participation of teachers and students in an action-oriented manner. These actually can be achieved through educational activities on DRR. The author would add one more part from the literature review of educational resilience that in order to strengthen educational resilience, educational activities alone is not enough,

there is a need for a comprehensive approach that consider both educational governance and educational activities on DRR.

Another finding is that school-based DRR education is considered as prominent compare to other studied approached as it provides continuing and sustained educational activities through formal, non-formal and informal education in school. This approach highlights the leading role of teachers and students as centrally involved in planning and implementing DRR activities while ensuring participation of all stakeholders as external support. The essential ideas of school-based approach is that DRRE should be rooted in school for intensive and sustained structural learning while outreach implemented in the community to spread the seeds of DRR.

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Chapter 3 Disaster risk reduction education in Vietnam

This chapter will provide a comprehensive look into the Disaster Risk Reduction Education (DRRE) in Vietnam. Firstly, the specific context of Vietnam regard to the natural conditions, demography, administrative system, natural disaster profile and impacts, and the education system will be described in detail. Secondly, the analysis of DRR policy will be carried out to understand how the DRR policies define the role of education sector in the country effort to reducing disaster risks. On the other hand, analysis of educational policy and DRRE policy will focus on how education defined the task of DRRE and how DRRE will be implemented in practice. On this basis, the interaction between DRR policy and educational policy toward the implementation of DRRE will be pointed out. Finally, the DRRE initiatives by governmental organizations, international organizations, social organizations, NGOs, private organizations, individual, etc. will be presented.

Contents

DISASTER RISK REDUCTION EDUCATION IN VIETNAM

3.1 Context of Vietnam

3.1.1 Natural conditions

Vietnam located South-east Asia, stretches from $23^0$23' to $08^0$02' north latitude and widens from $102^0$08' to $109^0$28' east longitude. It is a long, narrow country with more than 3,000 km of coastal line and covers an area of 332,600 square kilometers (GFDRR 2007). It borders China to the North, Lao PDR and Cambodia to the west, and sea to the east, south and southeast (Europa World). The country is made up of relatively complicated terrain: mountains, hills, deltas, rivers, lagoons, coastal lines and continental shelf. The topography is lower from the Northeast to the Southeast, especially in Central areas, which makes the land sloping and narrow. Its mountains, plains are closing to its coastline. In this part, the land is cut and divided by river originating from western mountain ranges flowing into the East Sea. Along the coastline are small plains. Between sloping mountainsides are narrow and deep valleys (GoV 2005b). Geographically, Vietnam is divided into the five zones: the mountainous zone, the midland zone, the plain zone, the coastal zone and the sea zone (GoV 2005b).

Climate in Vietnam is predominantly humid subtropical, with humidity averaging 84 per cent throughout the year. However, because of differences in latitude and the marked variety of topographical relief, the climate tends to vary considerably from place to place. The temperature shows high disparity between regions and seasons in each region as well as between the times of day in each region (MONRE Vietnam 2009). In the North, there are four climatic seasons, the south only has dry and rainy seasons, and the Central is under the effect of southwest monsoon. The average annual temperature is generally higher in the plains than in the mountains and plateaus. Temperatures range from a low of 5 °C in December and January, the coldest months, to more than 37 °C in April, the hottest month. Rainfall is high, unevenly distributed with annual average of about 2,000 mm. Annual rainfall is substantial in all regions and torrential in some, ranging from

1,200 to 3,000 millimeters. Nearly 90 per cent of the precipitation occurs during the summer (MONRE Vietnam 2010).

Vietnam is divided into seven areas that have different features of topography, geography, climate, and environment, thus prone to different types of natural disasters. These seven regions are: the Northeast, the Northwest, the Red River Delta, the North Central Coast, the South Central Coast, the Central Highlands, the Southeast, and the Mekong River Delta (Figure 3.1).

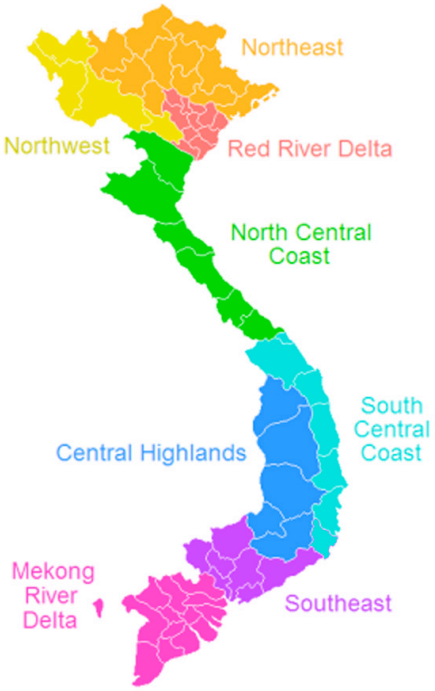


Figure 3.1 Geography regions of Vietnam (Source: GoV, 2005)

3.1.2 Demography, administrative and socio-economic development

Vietnam has a population of 91.5 million (as of Jul 2012) and is the world's 13th-most-populous country, and the eighth-most-populous Asian country. There is 30% of total population living in urban areas with rate of urbanization is 3% annual rate of change (estimated for the period of 2010-2015) (CIA World Fact book, 4 May 2013). Currently, Vietnam has 63 provinces and cities with 622 administrative units of districts and 10,511 administrative units of communes and wards.

Vietnam is a developing country that in the last 30 years has had to recover from the ravages of war and the rigidities of a centrally planned economy. Since the late of 1980s,

the country has experienced a period of rapid economic growth that has been closely associated with re-engagement with the regional and international economy. The development has been facilitated by the implementation of Doi Moi (Renovation) Program, started from 1986, which has opened the country's economy to international capital and introduced elements to the market economy. Substantial progress has been achieved since 1986 in moving forward from an extremely low level of development to significantly reducing poverty. The rate growth of GDP is about 8% during 1990-1997, and the economy continued to grow at an annual rate of around 7% from 2000 to 2005, making Vietnam one of the world's fastest growing economies. Growth remained strong even in the face of the late-2000s global recession, holding at 6.8% in 2010. According to an estimation of the International Monetary Fund, Vietnam's nominal GDP reached US$135.411 billion, with a nominal GDP per capita of $1,498 in 2012. As so, Vietnam transit from a centrally planned economy to a market economy and from an extremely poor country to a lower-middle-income country in less than 20 years.

Another achievement of Vietnam is the high adaptive capacity compare to other countries in the Southeast Asia (Figure 3.2). Adaptive capacity is the capacity of Vietnam to adapt with the changing environment, which is calculated base on the composite index of socio-economic factors including income per capita, literacy, life expectancy, poverty, inequality, technology, and infrastructure.

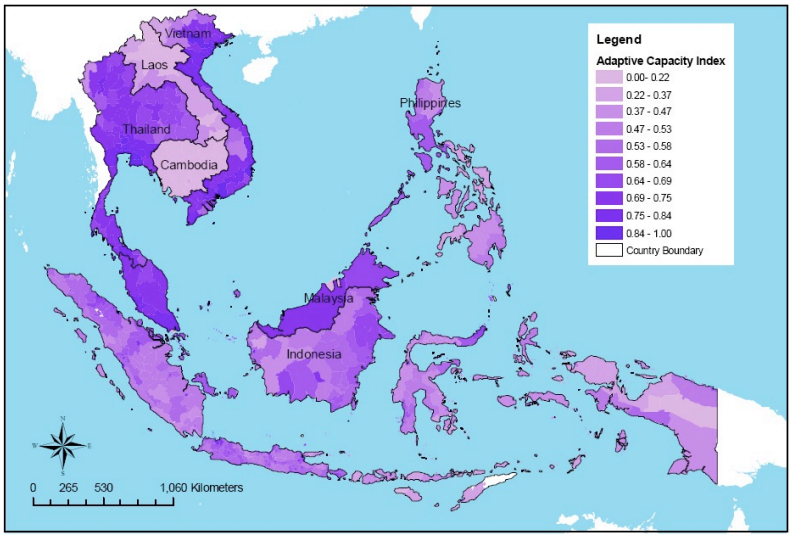


Figure 3.2 Adaptive capacity map of Southeast Asia

(Source: International Development Research Centre, 31 Jan 2009)

3.1.3 Natural disasters in Vietnam

3.1.3.1 Climate change and natural disasters' impacts

In 2007, an assessment by the World Bank listed Vietnam as one of the five countries in the world potentially most affected by climate change because so much of its population, infrastructure, and economic production are located in coastal low-lands and deltas defined in the Second National Communication on Climate Change submitted to UN Framework Convention on Climate Change (UNFCCC), Vietnam is "*particularly vulnerable to the adverse effects of climate changes*" (MONRE Vietnam 2010). According to the Climate Change Scenario developed by the Ministry of Natural Resources and Environment (MONRE) in 2009 and updated in 2012, the average annual increase in temperature, changes of rainfall, sea level rise and saline water intrusion are examples of climate change-induced stresses that will cause vast damages in Vietnam. Over the past 50 years (1951 – 2000), average temperature has increased about 0.5 - 0.7^{o}C. Annual temperature average over the past four decades (from 1961 to 2000) is higher than the annual average temperature of the previous three decades (MONRE Vietnam 2009). According to the updated scenarios in 2012, by the end of the 21th century, the annual mean temperature is projected to increase about 2-3^{o}C (medium scenario) over most of the country (MONRE Vietnam 2012). In all regions, changes in average rainfall are not uniform. There have been periods of increased rainfall and periods of reduced precipitation. On average, by the end of the 21th century, the annual rainfall would increase about 2-7% (MONRE Vietnam 2012). In Vietnam, these scenarios play an important role in climate change assessment for constructing and implementing action plans at ministries, sectors and localities to respond to climate change. Similarly, this sets the initial orientation for the MoET to assess the possible impacts of climate change on education sectors, development and implementation of action to adapt and minimize potential impacts of climate change in the future.

The location and topography of Vietnam make it prone to different type of climatic disasters. Estimation from the Global Facility for Disaster Reduction and Recovery (GFDRR) shows that 59% of Vietnam's total land area and 71% of its population are vulnerable to cyclones and floods (GFDRR 2007). The diversity of Vietnam's land and water areas makes it vulnerable to typhoons, tropical storms, floods, inundation, drought,

desertification, salt penetration, landslides, and earthquakes. Floods and storms are the two main natural disasters, as they occur frequently and cause severe damages to lives and properties. In more than 50 years (1954-2006), there were totally 380 typhoons and tropical depressions in Vietnam, of which 31% hit the North, 36% to the Northern Central and Middle Central Part and 33% to the South Central and the South (Center for Excellence in Disaster Management and Humanitarian Assistance 2012). Typhoon's landfalls usually accompany with high tide and heavy rain, thus resulting in heavy and long rains and floods. The flood season in Central on the rivers from Thanh Hoa to Ha Tinh is from June to October every year. Floods on these rivers generally occur on main streams thanks to the dyke systems preventing the overflow. On the rivers from Quang Binh to Binh Thuan, the flood season is from September to December. The Central region is characterized by short and steep river systems with rapid flows. Dyke systems in this region are relatively low or uncompleted. Therefore, floods not only occur on the mainstreams but also spread across the floodplains with the amplitude of above 8m (Do 2000, Tran *et al.* 2010).

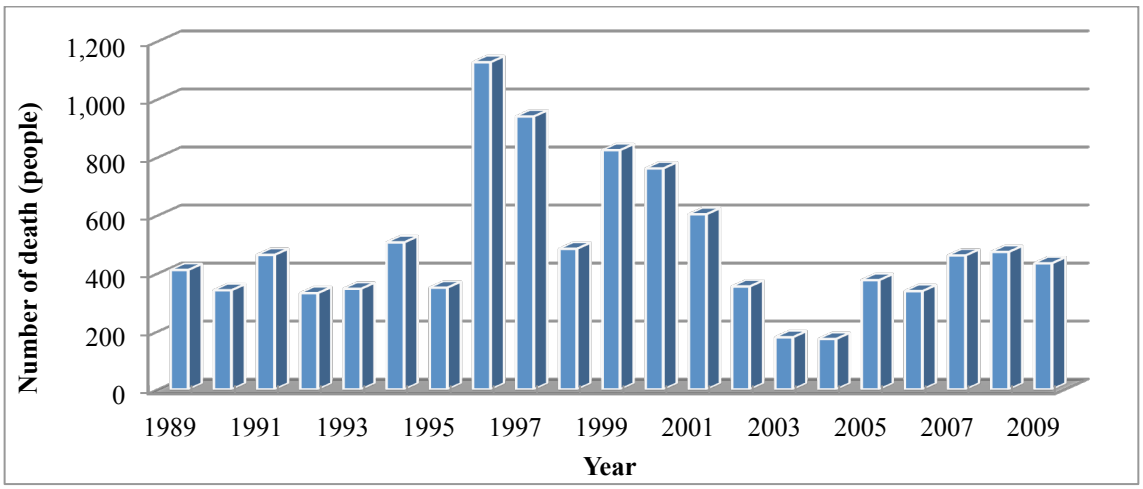
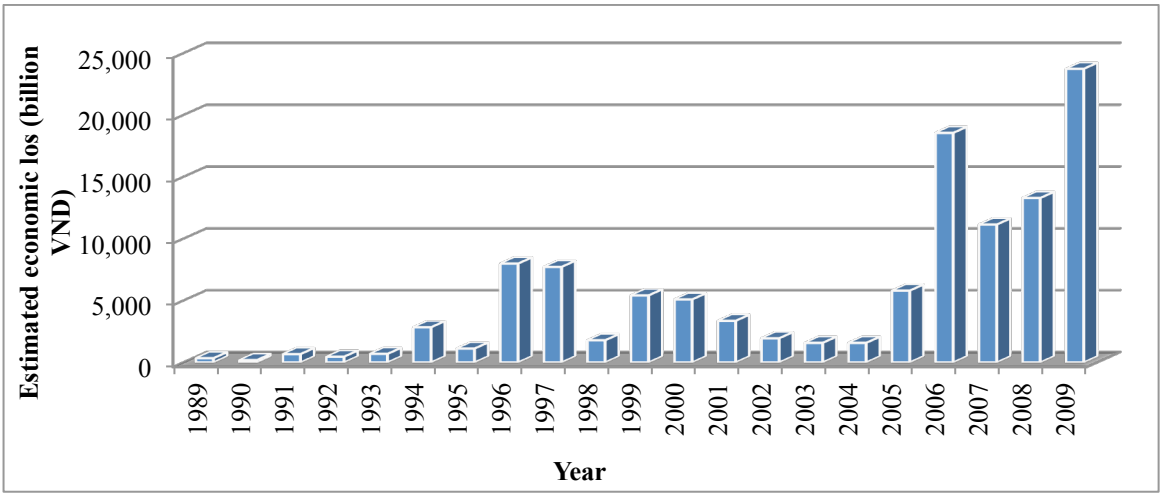


Figure 3.3 Number of deaths from 1989 to 2009 caused by natural disasters in Vietnam (CCFSC 2010)

Over the past 20 years, natural disasters have resulted in the loss of over 13,000 lives (GFDRR 2011b). In 2009, Storm No. 9 (Typhoon Ketsana) seriously affected 15 provinces in the Central and Central Highlands regions of Vietnam, killing 174 people and causing damage of over 14,000 billion VND (Figure 3.3) (CCSFC 2010). In 2010,

according to the report from the Statistics General Department, natural disasters left 173 dead or missing and injured 168 others in October 2010 only (GSO Viet Nam).



3.4 Estimated total losses (billion VND) from 1989 to 2009 caused by natural disasters in Vietnam (CCFSC 2010)

It was recorded that from 1989 to 2009, the total estimated loss from natural disasters in Vietnam was at 115,509 billion VND (around 7,286 million USD) (Figure 3.4) (CCFSC 2010). The spreading of economic activities into marginal areas such as floodplains, coastal swamps, drainage channels and other natural buffers is increasing and posing dangers to the local communities. Around 18 million people now live in low-lying river basins and coastal areas, and they are exposed to risks from multiple natural hazards (CCFSC 2010).

Table 3.1The top costliest natural disasters in Vietnam from 1999 to 2012

Disaster	Date	Damage (thousand US dollar)
Storm	28/09/2009	785,000
Storm	27/09/2006	624,000
Flood	27/10/2008	479,000
Storm	2/11/1997	470,000
Storm	30/11/2006	456,000
Drought	12/1997	407,000
Storm	24/07/1996	362,000
Flood	10/11/2007	350,000
Storm	28/10/2012	336,000
Flood	28/10/2007	300,000

(Source: EM-DAT 2013)

Table 3.1 shows the top costliest of natural disaster in Vietnam from 1999 to 2012. According to a report of GFDRR (2011), Vietnam lost at least 1% of GDP per annum from 1989 to 2008 due to natural disasters. The report stated that the post-disaster damage assessment and reporting system tended to under-report the economic value of damages. In addition, Vietnam could experience even higher losses in the future due to an increase in the concentration of assets at risk, and possibly an increase in the frequency and intensity of major events linked to climate change (GFDRR 2011a).

3.1.3.2 Natural disaster impacts on education sector

Natural disasters bring severe damages to the whole economy and society of the country, in particular for education sector. According to the MoET, education sector together with its huge population is bearing the most severe damages from disasters, especially by floods and typhoons (MoET Vietnam 2011). Natural disaster in Vietnam affects education sector in different ways, it causes both structural and non-structural damages, and the effects can be direct or indirect, which is some cases cost much more than direct impacts. Structural damages include destruction of school buildings and school facilities and equipment (Table 3.2). An estimated 5,120 schools were fully or partially damaged by Typhoon Xangsane (2006), especially in Da Nang City, resulting in a total loss of 300 million USD (CCSFC 2010). Educational damages by typhoon No 9 in Central and high land provinces in 2009 was 157,175 million VND (equivalent to 8.2 million USD as of 2009), including classroom collapsed, roofs blown away, flooded buildings, damaged learning chairs and tables, deteriorated books and computers, fallen fences, gates of schools collapsed, damaged toilet and common services (according to the reports received by the Administrative Office of MoET up to 02/10/2009). In addition to the visible damages caused by typhoons, the impacts by floods to school buildings are often invisible, difficult to see but its associated risks are tremendous. For example, slight discolorations on the walls and ceiling may go unnoticed for a long time as they gradually spread and get more severe. Molds spread throughout the space leading to serious health consequences. Saline intrusion is another type of disasters that also have severe effects on school buildings and structures.

Table 3.2 Damage caused to school building and facilities by natural disasters over the past two decades (1990-2009)

Damaged school building and facilities	1990-1999	2000-2009	Total damage
Total number of affected classrooms, including	85,801	56,405	**142,206**
- Number of destroyed and swept-away classrooms	20,395	2,594	22,989
- Number of broken and blown-up classrooms	4,568	7,153	11,721
- Number of broken and collapsed classrooms	60,838	46,658	107,496

(Source: CCFSC, 2010)

Non-structural damages are counted in the effects on human resources and educational continuity. Natural disasters took thousand of lives and faced school teachers and students with tremendous health problems and epidemics such as red eyes, diarrhea, etc. In addition, disasters caused many difficulties to the process of teaching and learning of teachers and students. The loss from natural disasters of education sector in the period of 2007-2009 was reported as in Table 3.3. During the period of three years (2007-2009), there were 13 teachers and 42 students died, 33 injuries, 147 classrooms collapsed and 190 schools reported delay in educational programs, which affected a huge amount of teachers (11,736 teachers) and students (210,290 students).

Table 3.3 Damages of educational sector by natural disasters during the period of 2007-2009

Year	Teachers injured	Students died	Students injured	Classrooms collapsed	Roofs blown	No of schools reported delay	No of teachers off schools	No of students off schools	Others	Economic losses
2007	2	22	6	96	1054	84	6330	110813	2021	51462
2008	10	16	21	28	242	43	1476	42347	1218	36406
2009	1	4	6	23	1784	63	3570	57130	1670	68587.2
Total	13	42	33	147	3080	190	11376	210290	4909	156455.2

(Sources: synthesis from reports of Provincial DoET, 2010)

The three consecutive floods in 2010 in the Central part forced students have to leave schools for a week and even a month in some low land areas, badly disrupt the learning and training processes.

Up to November 2013, Vietnam was hit by fourteen typhoons, of which there was super typhoon Haiyan, which made landfall as a Category 1 typhoon and forced more than 800,000 people were evacuated (*ReliefWeb,* November 12th 2013*)*. Before this, in September 2013, Central Vietnam was hit by two consecutive typhoons, Wutip packing winds of up to 64 mph per hour and gusts of up to 80 mph and made landfall, also

uprooted trees, cut power lines and damaged more than 1,000 houses (National Hydro-Meteorological Forecasting Center, 2013). The Government has closed schools, ordered all boats ashore and moved some 70,000 people to shelters in vulnerable areas in the central coastline (Al Jazeera America, accessed November 22, 2013). Another one was typhoon Nari slammed into Central Vietnam and caused about 12,000 homes destroyed or damaged in seven central provinces (The Weather Channel, accessed November 22, 2013). As a result, thousands of schools in Central Vietnam reported severe damaged school buildings, classrooms collapsed, destructive public services, and delayed school program for more than two weeks in some places (The State Media, Good Morning Program in VTV1, on board in November 15th 2013)

3.1.4 Education system in Vietnam

3.1.4.1 Educational achievements

Vietnam has made substantial achievements in the area of education. It developed a well-established national education system that is reaching uniform standards through a system that covers different levels of education from pre-school through post-university training. This system includes diverse forms of education and training qualifications through its network of general schools and vocational and professional training institutions. The entire country has succeeded in largely eliminating illiteracy and making primary education universal, and is in the process of universalizing lower secondary education. The net enrolment rates for boys and girls are more or less similar. Over 90 per cent of the working-age population is literate.

In school year of 2008-2009, there are nearly 7 million of primary school pupils, 5.5 million lower secondary school pupils and nearly 3 million of upper secondary school pupils and about 1.7 million higher education students, reaching the rate of 190 per 100,000 people (MoET Vietnam, 2011). According to the same report, staff and faculty of the education training system is 1,058,625 persons including 183,443 early childhood education teachers, nearly 800,000 of general education teachers, around 16,000 vocational professional education teachers, nearly 61,000 teachers and lecturers of universities and colleges. This is a large number of staff of highly qualified people, including many scientists and industry-technology leaders (MoET Vietnam, 2011).

Vietnam shows a variation throughout provinces in regard to student access to basic education. Compare with many countries throughout Southeast Asia, Vietnam is evidently significant differences in participation rates between urban and rural areas. There were a signification increase of students' enrolment in primary and secondary schools in urban areas since the beginning of the 20s (MoET Vietnam, 2011). With 41 percent of its population under the age of 18 years, Vietnam faces considerable challenges in providing services such as education to its young citizens. Schools responded to this dramatic increase in enrolments by introducing two shifts to enable each school to cater for one group of students in the morning and another in the afternoon. But the number of subjects has not altered nor has the need to access textbooks to pass examinations. Both factors impact negatively on student participation, retention and, importantly, achievement.

Regard to financing to education, total education expenditures increased by 27% in 2009 and 41% in 2010, compared to the 2008 expenditure levels (Table 3.4). According to MoET data, these expenditures will continue to increase in the next three years, so that by 2013, total education expenditures will have more than doubled from 2008 levels. However, the share of education expenditures over the total public expenditures slightly decreased each year between 2008 and 2010. In 2008 it represented 18.7% of total expenditures; in 2009 it amounted to 17.9%; in 2010, 17.4%. Education expenditures for Vietnam are expected to range between 16% and 17% of all expenditures for the period from 2011-2013. The education sector plan is accompanied by a medium-term expenditure framework for the education sector, which was formulated in 2005 covered the period from 2006-2008 (Global partnership for education 2012).

Table 3.4 presents information on government spending on education during the period of 2008-2010) and commitments in the national budget for the next three years (2011-2013). It also includes information for expenditures on teacher salaries, recurrent expenditures other than teacher salaries, capital expenditures, and basic education funding.

Table 3.4 Government Education Disbursements and Commitments 2008-2013

	Disbursements (US$ million)			Commitments (US$ million)		
	2008	2009	2010	2011	2012	2013
Total public expenditures*	19,859.50	26,477.55	30,073.72	35,225.24	42,166.60	48,546.58
Total to education	3,708.85	4,731.75	5,238.75	6,009.20	6,878.30	7,944.45
Education as a % of Total public expenditures	18.7%	17.9%	17.4%	17.1%	16.3%	16.4%
Teacher salaries	2,460.68	3,139.00	3,380.00	3,990.11	4,567.19	5,275.11
Recurrent expenditures other than teacher salary	615.17	784.75	845.00	997.53	1,141.80	1,318.78
Capital expenditures	633.00	808.00	1,013.75	1,021.56	1,169.31	1,350.56

Note:
*Data source: World Economic Outlook of International Monetary Fund (IMF), April 2011. Exchange rate: US$1 = VND$20,917.00

3.1.4.2 National education system

Education and training is a national priority area in Vietnam. According to the amended Education Law passed by Congress XII, the main goal of education of Vietnam is *to train the all-round Vietnamese with morals, knowledge, physical health, aesthetic sense and profession, loyal to the ideology of national independence and socialism; to shape and cultivate one's personality, quality and ability, satisfying the demands of building and defending the Fatherland* (GoV 2005a). The forms of education in Vietnam comprise formal and non-formal education and training.

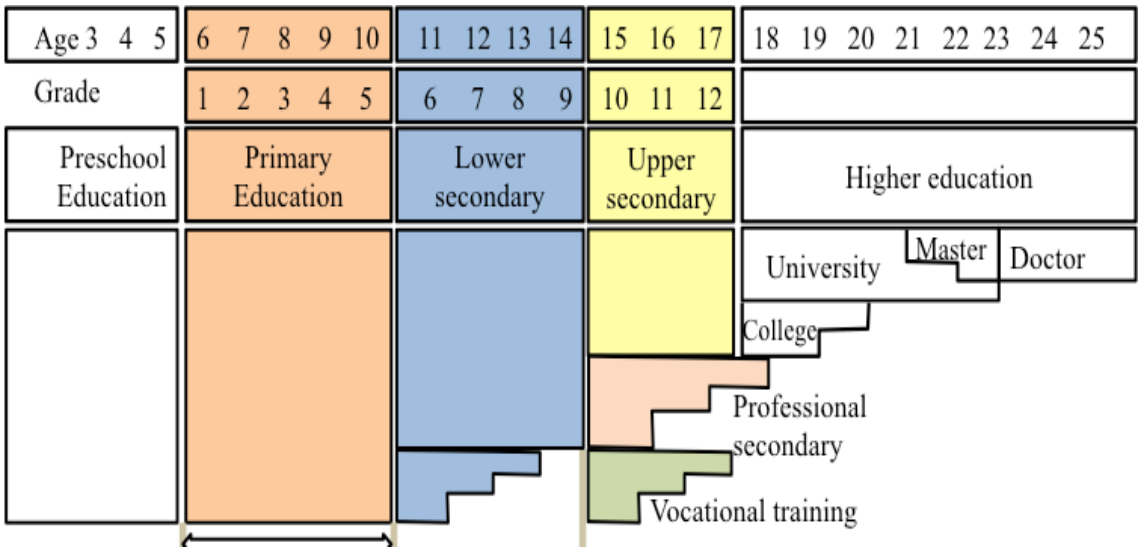


Figure 3.5 National education system in Vietnam

Based on sources of financial support, educational institutions fall into four categories. First, public or state-run (Cong lap) institutions are funded by the government. The majority of staff working in public schools is government officers or permanent staff members. Second, semi-public (Ban cong) institutions are provided with rudimentary premises by the State. Third, people-founded (Dan lap) schools are created and managed by a social organization and excluded from State funding schemes. Lastly, private (Tu thuc) schools or universities are financed and administered completely by individuals or groups of individuals. These forms of institutions are found in all levels of the educational system (Doan 2005).

Regarding the policy-making system, the central government, through the Ministry of Education and Training (MOET) and its departments, formulates and adopts education policies. In effect, education reforms are based on the overall guidelines and agenda promulgated by the Central Committee and the Politburo of the Communist Party. In other words, education policies are formulated, revised and updated in accordance with the State's general action plans defined at the National Congresses and the Vietnamese National Assembly manifestos every five years. In particular, the National Assembly also promulgates the laws on education and makes decisions concerning budgetary and strategic plans for educational development (Doan 2005).

3.1.4.2.1 Formal education

The national educational system comprises 4 systems: (1) Infant education composed of crèches and pre-school education, which caters to children until six years old; (2) General education comprises primary education and secondary education. The primary education consists of 5 years of schooling for students aged six to ten. Student who successfully completes primary education undertake four years of lower secondary education and three years of upper secondary education; (3) Vocational education comprises vocational secondary education and job training secondary education; (4) Higher education trains two degrees, college and university degrees; post university education has two levels, master's degree and doctorate (Figure 3.5). According to this system, students who satisfactorily complete lower secondary education have several options available to them. These options include continuing schooling at upper secondary

school or professional secondary school, or undertaking vocational training. Some students may also undertake non-formal education or commence work.

There are different types of institutions offering primary and secondary education: primary school, junior high school, high school, and multi-level general school, which can be further divided into (1) combined primary and junior high school, (2) combined junior and high school, and (3) combined primary, lower, and upper secondary school (these types of school only exists in socio-economically disadvantaged areas). Institutions offering education at the upper secondary level are under the authority of the provincial DoET, whereas the rest falls under the district level DoET . The revised Education Law adopted by the National Assembly on 14 June 2005 which entered into force on 1 January 2006 stated that primary education and secondary education are universal educational levels that are compulsory for all children aged six to fourteen.

Formal education in Vietnam is divided into curricular and extra-curricular education. The curricular education is the set of the fundamental subjects like mathematics, science, and social studies, which are decided by the MoET. In extra-curricular education, the school provides some activities that students can participate in outside of their regular school time, like cultural programs. Extra-curricular education is dependent on the school principal, and schools can organize programs as per their own wish. For disaster education in Nepal, no official special subject or program is established. One of the advantages of this is that the same education programs or contents can be provided to all students across the country. This is made possible when all schools follow a uniform standard curriculum

Primary education

In the 2004-2005 school year, Vietnam had 14,518 primary schools and 1,034 combined primary and lower secondary schools. The total number of primary students in the 2004-2005 school year was 7,773,484. In recent years, the number of primary students has continued to decline. It is believed that the reason is due to the decreasing population growth rate (i.e. the declining number of 6-11 year-old population) and the achievement of correct-age enrollment (previously, with pupil repetition and late-entry or over-aged pupils the number of students in primary schools was larger than 6-11 year-old population).

In order to fulfill the regulations stipulated in Primary Education Universalization Law in 1991 (i.e. every child must complete primary school at the age of 14 at the latest), for the past ten years the 5th of September has been chosen as the "Day for bringing children to schools" with the aim to encourage all families with 6- year-old children to bring their children to Grade 1. In 2000, the enrollment rate for 6-11 year-olds was 95%; this figure was more than 98% in the school year 2004-2005.

Primary education of 5 years is provided free of cost for children from 6-11 years of age but their families need to pay textbooks, uniforms and a small amount of money for the maintenance of the school, etc. These costs, along with other factors, constrain many poor families from sending their children (about 6 per cent) to schools. Among 94 per cent of children of that age go to school (UNICEF 2010), the difference of gross completion ratios for primary education can be clearly observed in urban and rural regions: the former reaching 89 per cent and the latter reaching just 80 per cent (Institute of Southeast Asian Studies (ISAS), Singapore, 2011).

Secondary education

Enrollment to secondary and high school educational levels has been increasing since the 1990s in Vietnam. The net secondary enrolment between 1993 and 2008 increased from 30 to 79 per cent and high enrolment increased 7 times (ISAS, Singapore, 2011). By the year 2010, Vietnamese government set a goal of universalizing the secondary education which means that all children of Vietnam can access this educational level. This laudable goal is proving difficult to realize as there are many school-aged students, particularly in rural and mountainous areas, who do not go to school – the dropout rate for secondary and high school levels being the highest – most likely because of the high costs of schooling that many families find unaffordable.

To graduate from high school, students must take a "leaving examination" with 6 subjects including Mathematics, Vietnamese Literature, Foreign Language, and three other subjects decided by the Ministry of Education and Training (MoET). This takes place at the end of 12th grade, and students who pass the leaving exam are awarded a diploma. Vocational education in Vietnam is available at both the secondary and tertiary levels. Its mission is to train students to be technicians or skilled workers in various

professions such as automobile engineer, electrician, agriculture processing and sewing workers, tailors, etc.

After the 10th grade, which is the final grade of secondary education, students have to take an examination called ‘‘School Leaving Certificate (SLC)’’ to prove that they have sufficient knowledge and abilities as 10th-grade students. Only after qualifying the SLC can they be permitted to enter higher secondary level. At this level, students select one of three specialized courses: science, humanity, and business. Hence, the secondary level (9th–10th grade) can be considered as the final education level in which students can take the same type of education in school together.

Higher education

Higher education institutions in Vietnam constitute of universities offering college, undergraduate, master’s and doctorate programs; colleges providing college programs and other lower level programs; and research institutes offering doctorate programs and master programs in cooperating with universities. Higher education institutions can also offer part-time programs such as in-service training, distance learning or instructed self-learning. The Education Law dated December 2nd, 1998 assigned that a student holding a high school diploma may pursue either a 4-6 year academic program for a bachelor’s or a 3-year academic program at a secondary college. A secondary college degree holder can then follow 1-2 years program for a bachelor’s degree. Bachelor’s degree holder may pursue an additional two year program for a master’s degree and 4 years for a doctorate degree. To enter a university or a college, students need to take entrance examinations among four main categories corresponding to the studies they intend to pursue later: group A (Math, Physics and Chemistry for students of engineering, computer science, physics, etc.), group B (Math, Chemistry and Biology for students of medicine and biology), group C (Literature, History and Geography for students of social sciences and humanities) and group D (Literature, Math and a foreign language for students of foreign languages and foreign trade).

3.1.4.2.1.1 The curriculum framework of primary education

Understanding of the current curriculum framework is crucial for the integration of DRR into the curriculum at primary level. The following part will examine the existing

conditions of the curriculum, the strengths and achievements as well as limitations and challenges.

Educational reform by means of curriculum reform

The basic educational reform in Vietnam has started since the formulation of the Resolution No 40/2000/QH10 and Instruction No 14/2001/CT-TTg by National Assembly and Government in 2000. Following the order, the MoET has implemented the educational reform by means of general educational curriculum renovation. Although curriculum is often considered as a combination of teaching and learning content, the new curriculum is now considered as comprehensive pedagogical action plan and structured as following: (1) educational goals, scope, level and content; (2) method and form of organizing educational activities; (3) evaluation of educational achievements. As a result, the educational program at all grades is unified nationwide. New educational conception and philosophy has been applied for the educational program in primary education in particular and in basic education in general. In addition, textbook relevant to new context of development tendency and international integration has been published. From 2002-2003, new curriculum and textbooks, beginning with the first and sixth grade, have been built across the country. After that, new educational curriculum and textbooks have been realized for the consecutive primary grade and lower secondary grade. In the school year of 2008-2009, the accomplishment of the 12th grade educational curriculum and textbooks makes it completed for the process of building new educational curriculum and textbook in basic education. Consequently, the primary education curriculum has been pilot for three rounds at all grades in the school year of 2007-2008. The new textbook is designed in a fixed sequence series of lessons, which also fix the flow and content of the syllabus for each subject. This system binds teachers to a rigid pattern of delivering each lesson, this in itself reducing flexibility in teaching and restricting student exposure to such activities as problem solving and integrated learning. Under these circumstances a student being trained to teach science will be trained in a separate methodology for delivering each of the three streams of science: biology, physics and chemistry which in effect entails being taught how to deliver textbook content in the prescribed sequence.

The national curriculum framework of general education

Primary education has been assigned the important roles to provide students with simple and needed knowledge on nature, society, and human being; to encourage development of basic skills in listening, reading, speaking, writing and calculating; to help students have the practice of daily physical exercise and hygiene; and to equip students with initial understanding about

Table 3.5 The official subjects in the curriculum at primary level (as of 2013)

For grade 1, 2, 3	**For grade 4, 5**
Vietnamese	Vietnamese
Mathematics	Mathematics
Nature and Society	Science
	Geography and History
Ethics	Ethics
Arts	Arts
Foreign languages	Foreign languages
Music	Music
Gymnastics	Gymnastics
Handicraft	Technology

(Source: Vietnam Educational Publishing, 2013)

singing, dancing, music and arts. There are ten different subjects and educational activities to support the education primary in completing its goals in educating people (Table 3.5). Life skills, environment understanding, other development tendency and issues are often integrated into the subjects of citizenship education, nature and society (grade 1, 2, and 3) and science, history and geography (grade 4 and 5). For each of subjects in a specific grade, there are knowledge and skill standards designated for every topic. In addition, requirements of attitudes are defined for a specific grade and at all level.

Among the subjects, the periods spent on the Vietnamese is the largest, followed by the subjects such as Mathematics, Nature and society, Science, and History and geography

Table 3.6 Basic education plan for primary education

Subjects and activites	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Vietnamese	10	9	8	8	8
Maths	4	5	5	5	5
Ethics	1	1	1	1	1
Nature and Society	1	1	2		
Science				2	2
History and Geography				2	2
Music	1	1	1	1	1
Fine Arts	1	1	1	1	1
Handicraft	1	1	1		
Technique				1	1
Gymnastics	1	2	2	2	2
Team activities	2	2	2	2	2
Extra activities	4 periods/month				
Total period/week	22^{+}	23^{+}	23^{+}	25^{+}	25^{+}

(Source: National Curriculum Guidance (in Vietnamese), 2003)

As from the Table 3.6, students have to attend at least 23 periods per week and deal with various topics from ten subjects. Given the large numbers of subjects, the curriculum becomes fragmented and congested and driven by end of year examinations that determine or reflect how well the textbook is being taught. The overall textbook and examination system is therefore gridlocked and rigid. Teachers are limited into the practice where the textbook provides the subject content and this cannot be varied owing to the tight test and examination regime put in place for each grade. Another challenge is that the national use of textbooks for all different regions has made the contents heavy, difficult and not relevant to students, in particular students in disadvantageous areas. The interaction among subjects is not clear such as between History and Geography, between Nature and Science.

Beside the limitations and difficulties, the new curriculum has attained some achievements including comprehensive in term of subjects and educational activities, responsive to the socio-economic development, up to date with the global trend and

issues. More importantly, the educational program has decreased the academic dimension, increased in practice. The integration of life skills through the subjects such as Nature and Society, Ethics, Science, History and Geography has opened up a large opportunity for bringing the knowledge into practice and encouraging the education toward action-orientation.

In addition to the compulsory subjects that described above, Vietnam has also included elective subjects in the curriculum. Primary schools can have elective subjects such as foreign languages (mostly English for grade 3-5 but in principle, since 2006 studying English is compulsory) and informatics education by the decision No.50/2003 QD-BGD&DT. Each elective subject grants two forty-minute periods per week. MoET also issued a guideline on teaching elective subjects in schools since the academic year 2006-2007. The guideline regulated that there would be 2 periods (45 minutes/period) in a week to secondary schools and 1.5-5 periods per week to high schools (depending on types of schools). This opens up an important space for the integration of DRR into teaching and learning activities.

3.1.4.2.1.2 Cross-curricular subjects in Vietnam

In Vietnam, aside from main subjects, there are cross-curricular subjects concerned with developing social awareness and empowering the individual for active citizenship that are mainstreamed through out the curriculum. For example, local education (LE), life skill education (LSE) are subjects that have cross-curricular dimension and are taught in subjects such as Science, Geography, Music, Arts, Ethics in primary education in Vietnam.

Local education

The National Assembly of Vietnam issued a directive to revise the general education curriculum on December 9th 2000 which was applied in Vietnam in the school year 2002 - 2003. As to the new curriculum of basic education, 15 percent of the teaching time schedule is allocated to a locally controlled curriculum component, of which teaching about local geography, history, culture, traditional vocations or trades, ethnic group languages, etc. is encourage (Do 2000). MoET has distributed the detailed direction on the subjects used for each of grade, as well as time allocation for each subject in the local education program. The implementation of local education varies from different places.

For example, in Hue Province, DoET is main responsible for designing teaching materials, checking and evaluating. Accordingly, there are 24 periods for Music, 14 periods for Arts, 2 periods for Ethics, 4 periods for History and Geography allocated for local education in the curriculum (Table 3.7). Meanwhile, in Da Nang City, teachers are requested to find and synthesize information by themselves for teaching. As such, contents of the local education program are designed freely, yet structure mainly followed the same design with topics, issues and questions for discussion. In sum, the current teaching of local education is largely depended on teachers' perception and knowledge.

Table 3.7. List of periods by subjects designed for local education program at primary level in Hue Province

	Music	Arts	Ethics	History and Geography
Grade 1	3	3		
Grade 2	6	3		
Grade 3	6	3		
Grade 4	6	3	1	4
Grade 5	3	2	1	

Source: Material "Local education in primary education", Hue DoET, 2008

Life skill education

Over the past two decades life skills education has come to be seen as important for young people to negotiate and mediate challenges and risks and enable productive participation in society (Wood *et al.* 2012). The World Health Organization (WHO) categorizes life skills into the following three components:

- **Critical thinking skills/Decision-making skills** – include decision-making/problem solving skills and information gathering skills. The individual must also be skilled at evaluating the future consequences of their present actions and the actions of others. They need to be able to determine alternative solutions and to analyze the influence of their own values and the values of those around them.

- **Interpersonal/Communication skills** – include verbal and non-verbal communication, active listening, and the ability to express feelings and give feed back. Also in this category, are negotiation/refusal skills and assertiveness skills that directly affect ones' ability to manage conflict. Empathy, which is the ability to listen and

understand others' needs, is also a key interpersonal skill. Teamwork and the ability to cooperate include expressing respect for those around us. Development of this skill set enables the adolescent to be accepted in society. These skills result in the acceptance of social norms that provide the foundation for adult social behavior.

- **Coping and self-management skills** refer to skills to increase the internal locus of control, so that the individual believes that they can make a difference in the world and affect change. Self esteem, self-awareness, self-evaluation skills and the ability to set goals are also part of the more general category of self-management skills. Anger, grief and anxiety must all be dealt with, and the individual learns to cope loss or trauma. Stress and time management are key, as are positive thinking and relaxation techniques.

In Vietnam, the LSE has been introduced since 1996 by UNESCO initiatives which in response to the perceived limitations of existing traditional subject areas in effectively addressing key challenges facing students (HIV and AIDS in particular) and to bring about necessary changes in behavior. The Ministry of Education directed the subject to be implemented at all primary education levels. In order to support for LSE in Vietnam, numerous efforts has been done by international and national organizations. UNESCO was one of the first organizations bringing LSE into Vietnam. It proposed the concept of life skills base on the four pillars of education for sustainable development, which emphasized LSE as 'Learning to be a real human being' and 'to behave properly in life' (UNESCO, 1996). In 2003, UNESCO organized workshop on "Quality education and life skills" helped to further clarify the life skills concept: (1) life skills refer to individual's ability (knowledge, values attitudes, skills) to perform life functions and to fully participate in daily life; (2) life skill approach based on the four pillars of learning: learning to know, learning to be, learning to do and learning to live together (UNICEF and UNESCO 2003). UNICEF has also introduced the core life skills: self-awareness, communicating, defining values, decision-making, assertiveness and objectives setting through "Life skills education to protect health and prevent HIV/AIDS for youth" program.

Vietnam has developed its own content on LSE including: (i) Essential skills (literacy, numeracy); (ii) Generic skills (accessing information, critical thinking, problem solving, teamwork, communication, etc.); and (iii) Applied skills - to be applied in

specific situations and contexts of socio-economic life (health, family, society, income-generation, etc.). Table 3.8 shows the content of LSE in the national curriculum from nursery to upper secondary level.

Table 3.8 Life skill curriculum framework in Vietnam

Nursery schools (0-3 years old):	kindergarten (4 - 6 years old):	primary education	in lower secondary level	lower secondary level:	upper secondary level:
Personal hygiene : don't eat dropped food; urinate and defecate in right places; wash hands before eating and after contact with dirty things; • avoid places with risks; don't put strange things into the mouth and nose; • be respectful but do not go with strangers; • understand others' emotions and express one's own emotions in appropriate way; • distingush right and wrong actions, etc.	Knowing oneself, the environment, and others • Knowing risks, unsafe places and ways to avoid them • Hygiene, health and taking care of oneself • Recognizing others' feelings and expressing own emotions • Basic social and behavioral skills of greeting, thanking and apologizing • Basic communication skills • Be able to solve certain problems in specific situations, etc	New contents: o Focusing on basic skills education: essential skills (literacy, numeracy); life skills for living in community; comunication; negotiation; leadership and cooperation skills; critical thinking; problem solving; decision-making; creativity; etc. o Focusing on active teaching methods • Life skills education included within some subjects : moral education, nature-society, and science subjects.	New objectives, contents & methods: o Renovation of objective: to form basic abilities of adapting, behaving, taking actions, and lifelong learning within the four pillars of learning; o Renovation of contents: increasing practical and application contents; connecting knowledge with real-life situations; etc. o Renovation of methods: shifting from teacher-centred to learner-centered methods; and from knowledgebased to skills/competency-based approach • Life skills education through some subjects, like technology; civics education; etc. • Through some programs/projects like "Healthy living and Life skills education"	New objectives, contents & methods: o Renovation of objective: to form basic abilities of adapting, behaving, taking actions, and lifelong learning within the four pillars of learning; o Renovation of contents: increasing practical and application contents; connecting knowledge with real-life situations; etc. o Renovation of methods: shifting from teacher-centred to learner-centered methods; and from knowledgebased to skills/competency-based approach • Life skills education through some subjects, like technology; civics education; etc. • Through some programs/projects like "Healthy living and Life skills education"	Objectives and contents - formation and consolidation of essential abilities to: act effectively; adapt to realities and changes; communicate; behave in human, civil and responsible way; be assertive, etc. • Enhance knowledge applications and use • Integrating contents of life skills such as HIV/AIDS; environment protection; drugs prevention; traffic safety; etc. into curriculum and textbooks. • Through extra-curricular activities programmes – teamwork; social skills; communication skills; plus knowledgebased life skills

(Source: MoET, 2006)

3.1.4.2.1.3 Extra-curricular activities framework

The main objectives of DRRE into extra-curricular are to encourage community involvement and self-learning capacity of students, as well as to improve the knowledge on local context. It aims at enhancing students' awareness and promotion of pre-disaster measures including improvement of community relationship. Extra-curricular activities

can be used for active school disaster education and for utilization of additional material developed. This method creates a collaborative learning environment in which students can access practical knowledge and develop relevant skills for DRR. Through extra-curricular activities, schools can collaborate with other social actors and offer a chance for them to contribute more actively to educating young generations; at the same time school education quality is also enhanced. Item 24.2 in Education Law of Vietnam states clearly that *extra-curricular programs are considered an important teaching approach, and one of the ways to innovate teaching methods towards promoting students' active participation, willingness, initiative and creativity, in accordance with characteristics of each class and subject, encourage students' self-study, train them how to apply knowledge into practice, raise their emotions, bring them joy and interest in learning.*

Article 26 (chapter III) of the regulations for schools in Vietnam issued by the MoET puts forward educational activities in schools, including curriculum and extra-curricular activities. As to that curriculum activities are done through compulsory or elective classes and extra-curricular activities include activities such as seminars, performance, gymnastics and sports, traffic safety, elimination of social evils, gender education, law education, vocational education, education of life skills, cultural exchange, environmental protection, field studies, volunteer activities, etc. Extra-curricula activities can be implemented flexibly into every school day (for example, the first 15 minutes of a school day), every week (45 minutes gathering every Monday), every month (monthly theme) or during summer vacation, etc. The time and schedule for extra-curricular activities are decided by the SMB base on the general direction of provincial DoET. There is therefore a huge variation between extra-curricular activities activities as well as programs from schools to schools. An example of extra-curricular activities for grade 6^{th} to 9^{th} (lower secondary level) in Chu Van An Junior include 18 periods (equal to 13.5 hours, 1 period is 45 minutes) in a school year.

3.1.4.2.1.4 School time

Schools in Vietnam usually start at the beginning of September, however, in many central provinces schools start 2 or 3 weeks earlier fearing an interruption due to weather conditions such as floods or typhoons which occur in the months from September to December. A school year normally has 2 terms and academic years are separated by long

summer holidays for about 3 months from June to end of September. During this time, some school activities are also organized requiring students' participation such as school cleaning, extra training and preparation for the new school year ceremony such as practice of marching, dancing and singing, etc. Classes are organized from Monday to Friday or Saturday depending on schools on a half-day basis (with about 4 hours per day) except some primary schools that are entitled to whole-day classes. Starting and finishing time of schools are different in summer (earlier) and winter and among schools. However, in general the morning classes normally start from 7 – 7:30 am and finishes around 11:30 am; and afternoon classes are from 1 – 1:30 pm to 5 - 5:30 pm. For whole-day classes in primary schools, it is often from 7:30 am to 4:30 pm. After-school club activities are not common. Each period is 35-40 minutes to primary schools and 45 minutes for secondary and high schools with a 5 to 10 minute break between consecutive classes.

3.1.4.2.1.5 The administration and evaluation system in school

Administration system

Tight state control of the education system in Vietnam is maintained through the MoET, which is responsible for all education and training at the national level including pre-school, general education, professional education, tertiary education and continuing education. MoET is the main agency responsible for educational matters nationwide, except several higher education institutions that are under other ministries and government agencies such as Hanoi Medical College of the Ministry of Health. The decree 322008-ND-CP dated on March 19, 2008 divided MoET into 19 separate departments and several related units. Among them, the most important are units responsible for primary and secondary education, higher education, teacher education, adult education and the finance and planning department. Article 1 of the decree clearly mentions position and functions of MoET as a government agency that "functions to perform the state management of education and training under the national education system and other education institutions, covering education and training targets, programs, contents, plans and quality; standards for teachers and education administrators; regulations on examination and enrollment; the system of diplomas and certificates; material foundations and equipment of schools; and the state management of public services in the domains under the Ministry's management according to law". Since

1996, a trend toward greater decentralization in education is gaining force in Vietnam. Specifically, government decrees No. 85/2003 and No. 166/2004/ND-CP allow local education authorities to implement long-term local education programs in their respective areas. Moreover, the Resolution No. 14/2005, dated November 2, 2005 and the Government's Higher Education Reform Agenda 2006-2020 also gave universities and colleges more power and autonomy of self management of funding, training, research, human-resources, and international cooperation by asking them to prepare their spending plans and implement them under the MoET's supervision.

While education for disaster risk reduction has not been popularized officially, it is difficult for local schools to find room to mainstream anti-disaster education in the current curriculum as "the more the national government regulates rigid curriculum standards, the less local school boards and individual schools have autonomy to devise what they see as the best curriculum for their students" (Komatsu, 2002).

Grading or evaluation system

Vietnam follows a 10-point grading system. The normal passing level is a 5. The following is MOET's published definition of grades but at the tertiary level there is substantial variation. Here is the definition: *Giỏi* (Excellent - 9-10), *Khá* (Good - 7-8), *Trung Bình* (Fair, pass - 5-6), *Kém* (Fail - 0-4).

For Higher education, a new credit system is now in place (although not available at all universities) to replace the older subject-based system. In the new credit system, each course is assigned a credit amount. Each credit represents one hour of theoretical lectures plus one hour of preparation per week over a 14-16 week semester. A four year program will normally require a total of 210 credits. Five-year programs require 270 credits and six-year programs require 320 credits (MoET, 2013).

3.1.4.2.2 Non-formal education

In Vietnam, non-formal education (NFE) offers the following programs: (i) illiteracy eradication and post-literacy education; (ii) education programs responding to the needs of learners, updating of knowledge and skills, transferring of technology; (iii) training and upgrading programs, programs for enhancement of qualifications and professions; (iv) programs leading to diplomas of the national education system (the forms of conduct in these programs include in-service learning, distance learning and guided self-learning).

These programs are mainly conducted at the Continuing Education Centers (CEC), which are organized at the provincial level and in main districts and towns and at Community Learning Centers (CLCs) organized at commune and ward level (UNESCO 2009)

In May 2005, the National Assembly approved the Revised National Education Law, which now recognizes CLCs as official local educational institutions, and the Government of Vietnam is establishing Regulations to promote the further spread of CLCs to reach more than 10,000 communes by year 2010. At the provincial level, networking of DOET, CEC and Teacher Training College in respective province is pilot-tested to support CLCs at the village level. The Revised Education Law (2005) stipulates that MOET will issue and provide learners who complete the equivalency courses of lower secondary education program, diplomas of lower secondary education (UNESCO 2009).

3.1.4.2.3 Teaching activities in school

Teaching styles

The teaching methodology in Vietnam is said to be out of date and needs to be reformed. Critics point to teacher-centered teaching methods, which encourage passive study habits among learners. *Chalk-and-talk* classes in Vietnam can be generally pictured as teachers primarily talk and students primarily listen while classes should be quiet. Although more student-centered methods are now promoted in Vietnam, actual implementation in schools remains weak. Saito *et al.* (2007) commented about the effort in Vietnam that "although the governmental policies pertaining to the curriculum are entitled 'child-centered education' there existed a huge gap between the policies and the actual practices. In reality, children, who need to be at the center of the educational policies and practices were still oppressed and regarded as marginal". Rote memorization is the main learning method in Vietnam, which has been, received lots of critiques. Baker and Baker (2003) said, "Classroom teaching in Vietnam seems to focus on rote memorization rather than on active learning". In response to this issue, the Minister of Education and Training said to *Thời Báo Kinh Tế Việt Nam* (Vietnam Economic Times) about changes in the educational system for the 2010-2011 school year that "we encouraged teachers, relevant departments and sectors to initiate their own teaching methods. This approach is expected to bring about a revolutionary change in the

education sector's teaching method" (Vietnam News, The National English Language Daily, 2010).

In classes, students are sometimes invited to answer teachers' questions. Students' debates against teachers are not common and most of the cases seen as being rude to teachers. The perceived lack of classroom discussions, debates and extra-curricula activities in Vietnamese schools is blamed on the dense curricula governed by the MoET which teachers are required to strictly follow. Such a curriculum is said to constrict the creativity of teachers as well as students.

Teaching profession

Education is highly valued in Vietnam and teaching is regarded as one of the most respected professions in the society. Teachers everywhere in the country are celebrated "Teachers' Day" on November 20th annually. On this day, Vietnamese society re-values the contribution of teachers to the development of the nation. Students and their parents show their appreciation to their teachers by presenting flowers and best wishes. The government uses this opportunity to commend good teachers for their devotion and commitments in teaching and training. At government level, the Resolutions of the VII and VIII Party's Congresses and 1992 Constitution confirm that education is the first priority of national policy. Public spending on education therefore accounts for some 5.3 per cent of GDP (World Bank, 2008).

Teachers in Vietnam are respected by others and are expected to be good models for students. This is evident from a four-year educational campaign, which began in 2006, which called for all teachers to be "a moral, self-study and creative mirror". Teachers are trained for the educational level that they will teach. Teachers in primary and secondary schools need to have qualifications from a college-level teacher training institution. However, the former must be able to teach all subjects and the latter must be able to teach one main subject and one more extra subject. Teachers of high school teacher are expected to graduate from a pedagogical university and teach specifically one subject only. The number of qualified teachers at all levels is not sufficient – a fact which has received a great deal of public scrutiny recently, resulting in calls for reform along the teaching methods. In fact, the pre-primary educational level has the lowest proportion of qualified teachers, about 51.1 per cent. The proportion of qualified teachers in primary,

secondary and high education is higher, at 77.16 per cent, 82.76 per cent, and 94.88 per cent, respectively (Nguyen, 2006). In-service training is compulsory for all teachers in Vietnam and takes place during the three months of the summer vacation.

However, there are numerous disadvantages that hinder teachers' ability to focus more on their professional. Firstly, the teaching schedules and other administrative procedures such as meetings, trainings are said to be one of the most constraint. As there are many changes regards to school program and administrative procedures, the teachers has to attend a lot of meetings to follow the revision, even revision of documents that have just been issued in a short time (EMDAT 2013). The media also reported that many teachers complained they did not have time to improve their teaching skills due to tasks, which are time-consuming, including meetings, paperwork and events, etc.

Unable to afford the normal living due to low payment is another problems that teachers in Vietnam have to face. According to MoET (2011), a teacher who graduated from a university will get around 2.5 million VND per month (approximately 125USD; 1 USD = 20.000 VND as of 10/2013). Since 2006, MoET has proposed to increase preferential ratio for teachers from average 1.35 times to 1.7 times. However, the government after discussing has not agreed, taking into account other sectors such as health, culture, etc.

3.2 Legal and institutional support for DRRE in Vietnam

3.2.1 Legal and institutional basis of DRR and the role of education for DRR

3.2.1.1 Legal and institutional basis of DRR

In Vietnam, DRR is considered as important task in every stage of the country's development. It is multi-sectorial and defined by the national policies and strategies presenting in the legal documents such as Orders, Ordinances, Decrees, Decisions, Regulations, and Circulars. The National Assembly has adopted numerous pieces of legislation related to disaster preparedness and mitigation, notably the Decree 73-CP on Dyke Protection (1963), Degree 55-CP on Flood Control (1972), Ordinance on Dyke Protection (1989). Recognizing the important role of a focal national agency in charge of disaster management, in 1990, the Council of Ministries signed the Decree No. 168-HĐBT to establish and outline the tasks of the Central Committee for Flood and Storm

Control (CFSC), the people's committees and the sectors at all levels. The Central CFSC formulates all regulations and mitigation measures related to typhoons and floods.

These documents had set a backdrop for establishment the First National Strategy and Action Plan for Mitigating Water Disasters (NSAP-MWD) in 1994. The tasks of disaster preparedness and mitigation have also been institutionalized by issuing law documents such as the Ordinance on Flood and Storm Control (1993). The Second Strategy and Action Plan for Mitigating Water Disasters (2001-2020) had been approved in 2001 set up several strategies in disaster mitigation and management that aimed to reduce disasters and their impacts on people, property, agriculture, economic well-being, environment, and equitable and sustainable development. These documents are considered as foundation of the National Strategy for Natural Disaster Prevention, Response and Mitigation (NS-NDPRM) to 2020, which was approved by the Prime Minister in 2007. This is an attempt to address the weakness reported in the previous action plans. It covers a wider range of hazards and designed in more details the responsibilities of implementing agencies.

In Vietnam, The Ministry of Agriculture and Rural Development (MARD) is the key main responsibility for the overall management of natural disaster mitigation and response work. The Central Committee for Flood and Storm Control (CCFSC), chaired by the Minister of MARD, provides a coordinating umbrella for disaster risk management. In reality, the CCFSC operates based on an ad hoc basis and active in case of a flood or storm. The daily management responsibility is held by the director of the Standing Office of the CCFSC who is also the director of the Department of Dyke Management, Flood and Storm Control (DDMFSC) under MARD. In each ministry or sector, there is a committee in charge of flood and storm control, usually chaired by a vice minister or equivalent. However, this committee is only active during the flood and storm season, within their ministry or sector, and with little interaction with other ministries. Similarly, the education sector also has its own CFSC from MoET to local DoET, which cooperate closely with the overall CFSC and offices from national to local level. According to their own functions and duties, ministries, sectors and local entities are responsible for different tasks to bring about DRR.

Figure 3.6 presents the relationship between the central, provincial and the local level in giving information, direction and reporting, rescue and relief work in the education sector. The overall management and technical power on DRR in the education sector is mainly done by the cooperation between CFSC and educational agencies from central to local level. At national level, MoET has responsibility to receive and report needed information directly form CCFSC. At provincial level, the CFSC is chaired by the chairman of the provincial People's Committee (PPC), which cooperates with provincial DoET to be in charge of the flood and storm control plus research and rescue activity in the education sector. Similarly, at district level, the CFSC is also chaired by the chairman of the district PC and direct district DoET in disaster risk management. Simultaneously, district DoET is accountable for reporting back to district CFSC and provincial DoET after disaster. At commune level, the CFSC is also chaired by the chairman of the commune People Committee and cooperates with army force and other civic society organizations to help the school and community to response to disaster.

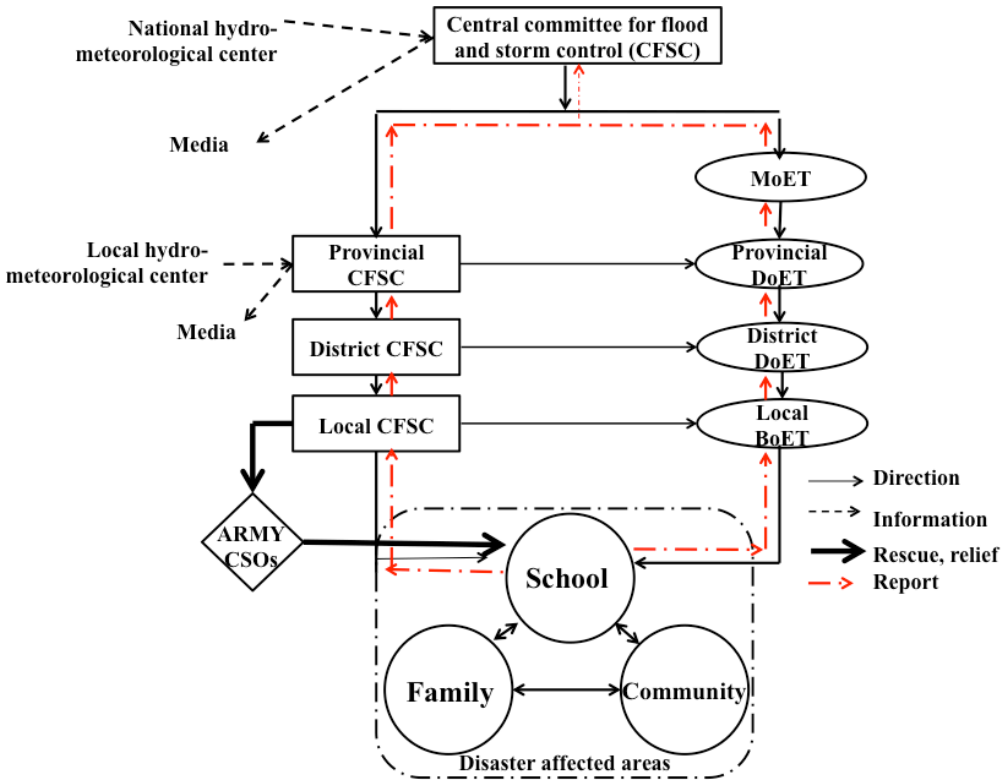


Figure 3.6 Information flow for disaster response and recovery from the Central CFSC to the local level in the education sector

3.2.1.2 The defined role of education sector for DRR

At national level, the first legal document that mentioned about the role of education in DRR is the NSAP-MWD (1990-2000), which was prepared in 1994 and updated in 1995. It identified the need for an approach to disaster management that provides a mixture of engineering, institutional and social measures to reduce the vulnerability of the country and improve its capacity to cope with disasters. Three main objectives of the First National Strategy were to reduce the number of people killed and missing, and to limit the negative impacts of water disasters on social activities; to enhance the effectiveness of measures for hazards and disaster damage reduction in water disaster prone areas and to improve the natural and man-made environment. It established a raised consciousness and sense of responsibility in the general sector for disaster mitigation and management. The role of education was mainly stressed on raising awareness for decision-makers at the central and local level.

The tasks of disaster preparedness and mitigation has been gradually institutionalized by issuing legislative documents such as the Ordinance on Flood and Storm Control, which designated the responsibilities of state agencies, authorities at all levels, socio-economic organizations, and all citizens in the duties of prevention, response and recovery from the consequences of floods and storms. It defined the role of education sector in the effort of DRR as: (1) Raising awareness, disseminating knowledge, experience and law about the prevention of floods and storms; and (2) Organizing and training for taskforce on the prevention of floods and storms.

Following this, the second NSAP-MWD (2001-2020) had been approved in 2001 set up several strategies in disaster mitigation and management that aimed to reduce disasters and their impacts on people, property, agriculture, economic well-being, environment, and equitable and sustainable development. This is an attempt to address the weaknesses reported in the previous action plans. It covers a wider range of hazards and designed proper solutions for each of different sectors with the clear responsibilities of implementing agencies. The education sector was mainly responsible for strengthening people capacity on disaster preparedness and mitigation.

The latest NS-NDPRM was issued in 2007, which identifies the role of education for DRR is to raise awareness and disseminate experience of disaster prevention, response

and mitigation, especially at commune, village, and hamlet. The role of education sector has been defined in the third NS-NDPRM as mainly in raising awareness and disseminating experience on disaster prevention, response and mitigation, especially at commune, village, and hamlet level. The specific targets for this are 100% of local staffs who directly work in the field of disaster prevention, response and mitigation at all levels to be trained and strengthened of capacities for disaster prevention, response and mitigation; and more than 70% of population living in disaster prone areas to be disseminated of knowledge on disaster mitigation. In order to achieve this, it is the responsibility of education sector to:

- To include basic knowledge about natural disaster prevention, response and mitigation into school curriculum to help children know how to respond to and support their family and community in disaster situations;

- To promote activities for information dissemination, education, awareness and disaster response capacity raising for communities;

- To provide training for those who are directly involved in disaster prevention and mitigation, especially for decision-makers, managers, planners, practitioners, and local officers

One of the most important legal documents provides strong institutional support for DRRE is the Law on Disaster Preparedness and Prevention. It has been issued recently in 2013, yet will have effect in May 2014. This document highlighted that DRRE must be included as one of the five top strategies for the country to cope with disasters. It enforces the participation of people to DRR activities through different types of education from formal to informal, from basic education to higher education, community education and continuity education.

Together with the development of legal and institutional basis on DRR, the DRRE approach has been also transformed from general public awareness raising to integration into formal and informal education and training, which ensure the implementation and impacts of DRRE reach all individuals. Accordingly, there is shift of education role from being involved in DRR (in the first and second NSAP-MWD), to fully take lead of one priority of DRR, the DRRE activities, in cooperation with other ministerial and

governmental organization (in the NS-NDPRM and the Law on Disaster Preparedness and Prevention).

3.2.2 Educational policy focus on DRR

3.2.2.1 General education policies

Beginning in the early 1990s, the Government of Vietnam put in place policies to enable the education system to 'modernize'. Since 1991, educational reform in Vietnam is described, like Doi Moi, as a process of renovation. In official literature: *Renovation in education and training is an important part of the renewal of the state. The basic task of renovation in education is to shift from meeting the needs of a subsidized, centrally planned economy to meeting the needs of a multi-sector, state-managed, socialist oriented market economy. Investment in education and training must be regarded as one of the main targets for development investment. Conditions must be created to allow education to serve socio-economic development even more actively* (MoET, 1995, p. 14).

The Fourth Plenary Session of the Committee held in January 1993 re-committed the government to 'continued renovation of the education and training cause' and determined that education and training were 'the driving force and ... the basic condition for realization of socio-economic objectives'. This resolution reiterated that investments in education are 'considered as one of the principal directions of investment for development' (MoET, 1995, p. 20). To place these policies within a legislative framework, the Prime Minister determined in November 1993 (Decree No. 90CP) a new general framework for the national education system to enable improved access to school education, strengthening transition rates to and retention in lower secondary school education and upgrading the standards and improving the structure of higher education (SRV, 1995, pp. 26-27). This commitment of the Fourth Plenary did see a steady increase in the government budget dedicated to education and as a result, education has a steady increase in enrolments. Also, the improvement in the quality of school education has opened up a lot of chance for the integration of different social issues into education sector, including disaster risk reduction.

3.2.2.2 The National action plan for DRRE

In 2011, MoET has developed the Action plan to implement the NS-DPRM in the education sector. Currently, this document plays a crucial and unique role in guiding the implementation of tasks and solutions to achieve the objectives set out in the work of DRRE. The Action plan has incorporated many initiatives from the NS-NDPRM. It has five specific objectives to be completed by 2015:

First, by 2015, 100% of staff and officers of education management agencies and managers of education establishments will have high awareness on natural disaster prevention, control and mitigation. By 2020, dissemination of information and awareness raising for education establishments and communities in particularly vulnerable areas will have been accomplished so that officers, teachers, students and communities understand and know how to respond to natural disasters.

Second, by 2020, training on capacity building on natural disaster prevention, control and mitigation will have been conducted for 100% of managers of education establishments and staff in charge of natural disaster response in the education sector. By 2015, 100% of education establishments in particularly vulnerable areas have established a work plan to prevent, control and mitigate natural disasters; A Steering Board for natural disaster prevention, control and mitigation will provide skills and knowledge on natural disaster prevention, control and mitigation as well as an effective communication system.

Third, by 2015, the integration of basic knowledge on natural disaster prevention, control and mitigation into education programs and extracurricular activities will have been accomplished. From the year 2016, all activities will be conducted in accordance with the specific work plan of MoET.

Fourth, by 2015, the organization of training courses for natural disaster prevention, control and mitigation will have been accomplished.

Fifth, by 2012, the study and design of natural disaster courses will have been accomplished; by 2015, pilot natural disaster prevention, control and mitigation courses will have been accomplished in some selected areas; from 2016 to 2020, a universal model of natural disaster prevention, control and mitigation will have been applied in accordance with the specific work plan of MoET.

In order to achieve these five specific objectives, there are ten tasks were defined:

1. Review legal normative documents, mechanisms and policies related to natural disaster prevention, control and mitigation in the education sector
2. Awareness rising on natural disaster prevention, control and mitigation in the education sector
3. Provide training and refresher courses on natural disaster prevention, control and mitigation for staff and teachers
4. Bring knowledge on natural disaster prevention, control and mitigation into schools
5. Organize training on natural disaster prevention, control and mitigation
6. Study, design and demonstrate model on natural disaster prevention, control and mitigation class/school
7. International cooperation in natural disaster prevention, control and mitigation
8. Survey and assessment on natural disaster prevention, control and mitigation in education sector
9. Establishment of organizational apparatus and cooperation mechanism in natural disaster prevention, control and mitigation
10. Establish fund and contingency resources for natural disaster prevention, control and mitigation in education sector

From these ten tasks, MoET has prioritized five programs to be implemented with defined responsibilities for stakeholders. These are: integration DRR into school curriculum, Training for governmental staff, teachers and community, awareness raising campaigns in school and community, and assessment and planning for disaster preparedness, response and recovery. Each of programs will be implemented into two phases with the defined content of work and allocated financial resources (Table 3.9).

Together with the establishment of legal basis on DRR, the institutional basis of DRR has been gradually evolved. From the initial task force style (in Ordinance of storms and floods control), it was transformed to specific agencies, the Central CFSC as well as involvement of more governmental organizations at different levels. Accordingly, CFSC in the education sector was established from central to local level, which is responsible

for transfer information and report to higher level. In addition, the system gradually progressed from research and rescue during emergencies (in Ordinance of storms and floods control) to a comprehensive DRR system (in NS-NDPRM) that covers the four phases of DRR cycle. This has been fully integrated into the Action plan of the education sector. Thus the aims of DRRE are not only to provide knowledge and skill for people to understand and act to response to disasters, but also to develop plan for a quick recovery from disaster.

Table 3.9 The five programs on DRRE are prioritized by MoET

Projects	Budget (%)	Time schedule
		2011 12 13 14 15 16 17 18 19 20
1. Integrate DRR into education and training	10	
2a. Establish legal and institutional supporting system	0	
2b. Establish a steering board	0	
2c. Awareness raising	3.85	
2d. Establish contingency fund	3.85	
3. Disaster assessment	2.31	
4. Human resources training on DRR	10.77	
5. Develop disaster resistant school	69.23	

(Source: MoET 2011)

3.2.2.3 The National action plans on other types of education

In the past two decades, Vietnam has made a great of efforts on education with a number of programs including Environmental Education (EE), Life Skill Education (LSE), Climate Change Education (CCE), DRRE, Education for All (EFA), and Education for Sustainable Development (ESD). Although there are separated action plans, the operation of each type should not in isolation but much depends on others (Figure 3.7). However, the implementation mechanism between these campaigns has been reported lack of cooperation among each other, which cause overlapping yet integrative effects on educational development.

EE has its employment from the issue of National action plan on education for environmental protection in the period of 2001-2009. This first wave called a large attention for systematic changes, such as increasing standards and regulation on environmental issues in the education sector. By looking at the long path of EE involution and the formulation of DRRE, it is clear that DRRE has originated from EE. EE has mainly approached through general education and science education, which focused on the (1) integration of EE contents into education and training, and (2) research and technology transfer on EE. To an extent, framework and guidelines for EE can still be applied for DRRE, thus evolvement of EE has specific implications to the development of DRRE.

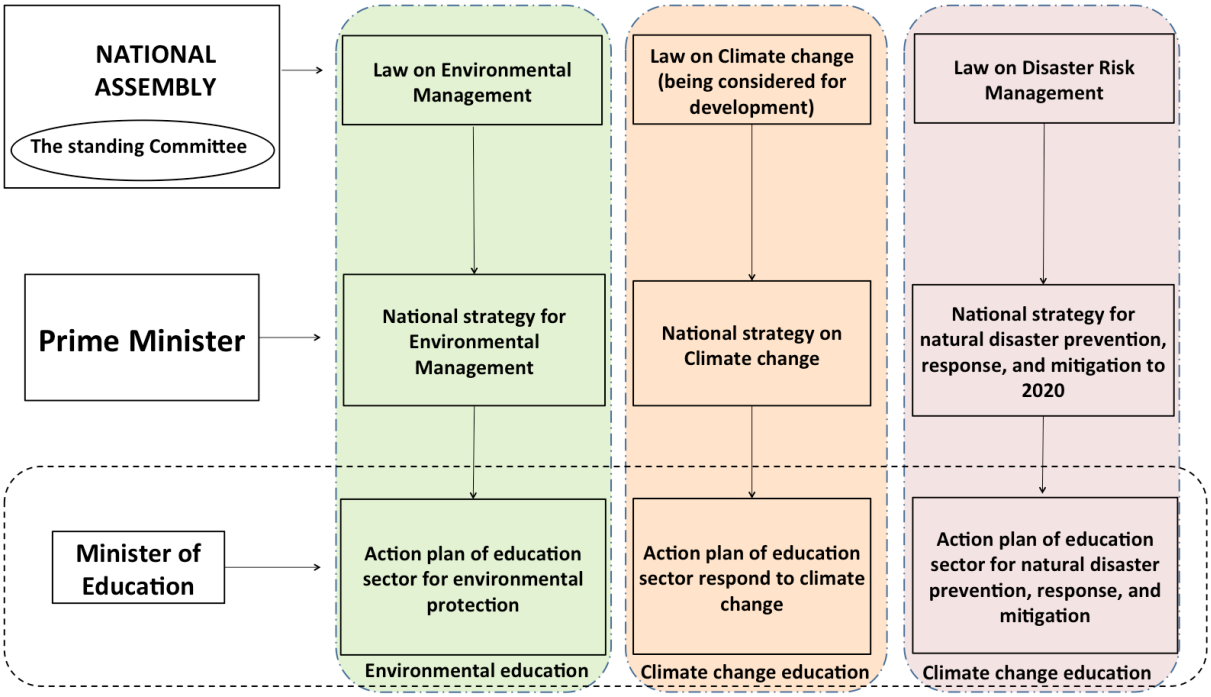


Figure 3.7 Legal framework of EE, CCE, and DRRE

CCE is a response to the National strategies on climate change in the education sector. In 2010, the Action Plan of Education Sector Response to Climate Change from 2011 to 2015 has been approved by the MOET, which is followed by the formulation of the project "Integration of climate change response contents into education and training programs in the period 2011-2015". The general objectives of the action plan are raising awareness, the ability to cope with climate change for education sector in each specific period to ensure the educational sustainable development, preventing and mitigating the

threat of climate change, and contributing proactively to the implementation of the National Target Program Response to Climate Change.

Review of DRRE and CCE policies indicates that these two systems are supportive and complementary. DRRE and CCE share the same timeline for many targets, especially for the integration of the CCA and DRR contents into the national curriculum, the study and propose models of schools resistant to disaster and climate change.

ESD has been embraced from the establishment of National ESD Committee in 2006, and officially applied through the National Action Plan of Education for Sustainable Development (NAP-ESD). From that, substantial progress on ESD has been promoted to link ESD to existing educational program and projects. One of the main goals of DRRE is to contribute proactively to the implementation of the NTP-DRR whereby ensuring sustainable development is a crucial factor. Both documents on CCE and DRRE orient toward the promotion of prescriptive learning at the same time empower students' role in responding to disaster and climate change and contributing to the goals of sustainable development.

There are both complementariness and conflicts between the application of EE, DRRE, CCE and ESD. Similarity can be seen through the approach to these types of education, of which the inclusion of issues on environment, DRR, CCA and sustainable development in the education is fundamental. Accordingly, the advance of curricular, extra-curricular, textbook, reference materials and tools for teaching and learning in EE, DRRE, CCE, and ESD is employed at all levels from pre-school through higher education, science education and technical and vocational training using diverse types of education from formal, informal and non-formal education. Aside from this, building capacity for educational staff, educators, teachers and lectures is considered as an indispensable part of polices on EE, DRRE, CCE and ESD.

In contrast, differences between these four are also recorded as one of the main challenge for the development of DRRE in particular and of education system as a whole. The role of science and technology education, which is highlighted in larger national policies as *"To promote scientific and technological activities to establish the scientific and practical basis"* has been reflected only in EE and CCE yet absent in DRRE. Simultaneously, while one of the main thrusts for ESD is boosting and improving basic

education and reorient existing curricula, the CCE and DRRE follows a strategy to mainstream climate change and disaster issues within the current education and training system.

All of these create a platform to open up the possibility of simultaneous application of EE, DRRE, CCE and ESD within education system at all levels. These findings also have implications to how these multi-dimensional concepts can be joined together in a holistic and integrated framework. One way is to stress on the role of MoET and DoET to coordinate with other organizations in bringing the objectives and principles of different types of education into existing agendas and programs at national and local levels. At school level, it is the responsibility of the Principals to connect different types of education in ongoing programs.

3.2.3 Operational framework for DRRE implementation

According to the DRRE policy, the practice of DRRE will be managed under a Steering Board established by Department on infrastructure, school equipment and child toys. It is responsible for developing instruction to carry out the Action Plan and for reporting to the Minister. All operations will be overseen by the Central CFSC under the management of the Prime Minister. At local level, Steering Board is required to set up in local DoET and relevant educational establishments, education and training institutions, universities, colleges, and vocational schools.

Although the coordination is a complex undertaking, to an extent, Table 3.10 (MoET, 2011) presents each of stakeholders' contribution in an overall framework of practicing DRRE. The current framework for DRRE consists of various stakeholders from governmental organizations to international organization, from inside the education sector to outsiders, from national to local level to ensure the comprehensive implementation of DRRE (Figure 3.8). In particular, employment of all departments under MoET in DRRE implementation will help to incorporate the DRR issues into every piece of educational strategies, thus sustain DRRE activities and enlarge its influences. At ministerial level, MARD, which was defined in NS-NDPRM (2007) as leading the national dialogue on DRR, is designated to support for the integration of DRR knowledge into school. Ministry of Construction (MoC), as defined in NS-NDPRM is responsible for establishment and maintaining major public works, involves in modeling schools

resistant to disasters. However, if consider DRR and Climate Change Adaptation (CCA) as the two integral part of sustainable development, the role of Ministry of Natural Resources and Environment (MONRE), as leader of the national dialogue on CCA, has to be considered in the implementation of DRRE. This has its implication from the lack of coordination between MARD and MONRE on the work of DRR and CCA, which has not yet been built in the establishment of NS-NDPRM and National Strategy for Climate Change Adaption (NS-CCA). This may erode the steering capacity of the MoET to carry out activities to attain the set goals. Thus, for more sustained and effective implementation of DRR, the cooperation between MOET and other ministries has to be stressed in further supporting mechanism.

Furthermore, engagement of Educational institutions, Institute for School studies and Institute of Educational Science are focused on developing basis for research-informed management mechanism. It encourages the application of DRR technology, employment of disaster potential survey and analysis, hazard analysis and scenario simulation with scientific methods, and publishes the result of the survey and analyses in time. Besides, there is a need to employ more from outside mass media than Educational Newspaper to wider spread the consequence of the DRRE practices. As media organizations increasing their impacts on learning

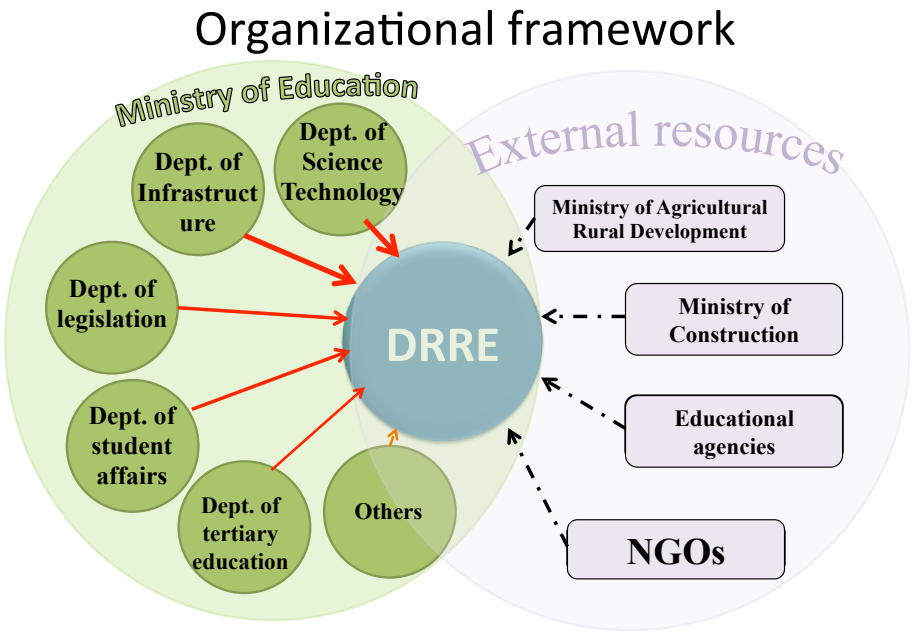


Figure 3.8 Organizational framework for DRRE

Table 3.10 Participation of stakeholders in the implementation of DRRE

Organizations	Tasks
Department on infrastructure, school equipment and child toys	· Establish Steering Board for natural disaster mitigation, prevention and control under MoET · Organize and operationalize a contingency fund; · Formulate the projects on information collection, assessment of pre-, during and post-natural disasters; · Study and design model of school resilience to disaster; · Assist Steering Board to appraise and approve outline description and projects on DRR; · Organize the assessment and monitoring of the implementation of DRRE · Support for the integration of DRR into education and training
Department of Science and Technology	· Integrate DRRE into education and training · Compile DRR materials and provide training for staff and teachers.
Department of Students	· Provide programs on DRR awareness raising for students; · Mainstream the relevant DRR activities into the existing programs and projects related to students; · Support the projects on information collection and assessment of pre-, during and post-natural disasters
Legal Department	· Review, revise and formulate legal documents, mechanisms and policies relevant to DRRE
Department of Tertiary Education	· Provide DRR training to meet social needs on human resources in the field of DRR
Department of International cooperation	· Promote international cooperation, attract investment and financial and technical support, capacity building, contribution to successful implementation of the plan; · Coordinate with Steering Board to organize joint forums, international meetings, negotiations, bilateral and multi-lateral cooperation in DRR under the management of MOET · Support for the integration of DRR into education and training · Support the projects on information collection and assessment of pre-, during and post-natural disasters
Department of Finance and Planning	· Be responsible for financial allocation and provide guidance on financial management related to the implementation of the action plan · Support the management of contingency fund · Support the projects on information collection and assessment of pre-, during and post-natural disasters · Cooperate to provide DRR training
Administrative office of MoET	· Cooperate in organizing information and advocacy in schools and community · Support for the integration of DRR into education and training · Support the management of contingency fund
Department of Specialized Education	· Support for the integration of DRR into education and training · Cooperate to provide DRR training to meet social needs of human resources in the field of DRR
Department of Remote Education and Training	· Support to the provision of DRR training to meet social needs of human resources in the field of DRR
Educational Institutions	· Cooperate to provide DRR training to meet social needs of human resources in the field of DRR

Educational Newspaper	· Cooperate in organizing information and advocacy in schools and community
Institute for School Studies	· Support for designing of model on natural disaster prevention, control and mitigation classes/schools
Institute of Educational Science	· Support for the integration of DRR into education and training · Support for designing of model on natural disaster prevention, control and mitigation classes/schools
Ministry of Agricultural and Rural Development	· Support for the integration of DRR into education and training
Ministry of Construction	· Support for designing of model on natural disaster prevention, control and mitigation classes/schools
International organization	· Support for the integration of DRR into education and training · Cooperate in organizing information and advocacy in schools and community · Cooperate in management of contingency fund · Support the projects on information collection, assessment of pre-, during and post-natural disasters · Support for designing of model on natural disaster prevention, control and mitigation classes/schools

Source: MOET, 2011

through wider communication, it opens a new dimension and provides an innovative mean to education. On the other hand, the role of international organization has been underlined both on technical and financial support for DRRE practices from national to local level. However, a high rely on the outside resources results in an inactive implementation and impede the progress. While various stakeholders are involved in the implementation of DRRE, role of private sector has not yet mentioned. Given wide outreach to community, private sector can provide excellent advocacy and communication support to education and learning process. Thus, more attentions need to be paid on the wider incorporation of different stakeholders in the implementation of DRRE to helps the education sector fulfill the set targets in an effective manner.

3.3 DRRE initiatives

Education for DRR has its embrace from the long history of coping with natural disaster in Vietnam. Since the local communities has prepared, responded and recovered from natural disasters using their own wisdom and knowledge, which pass from generation to the next. The indigenous practices, to an extent, can be seen as one of the first initiatives of DRRE, and will be a valuable source contribution to the community and school education for DRR.

Before the issuing of the National Action Plan on DRR in the education sector, DRRE has formed and implemented yet to be applied fully and systematically through the formal education system. DRRE initiatives were mainly implemented by NGOs and other organizations than governmental organizations. According to a mapping activity to collect information regarding projects and programs on communication and education in climate change and DRR by Live and Learn and Plan in Vietnam (Live and Learn Vietnam, 2012), more than 50% of the programs and projects were implemented by INGOs or NGOs in Vietnam (Figure 3.9). The topic mainly focused on climate change education (52%), about 28% focused on DRR, and 20% have integrated both themes (Live and Learn Viet Nam 2012) (Figure 3.10).

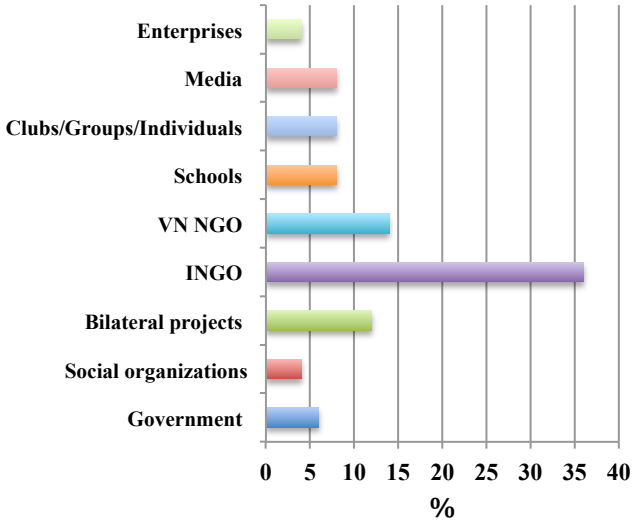


Figure 3.9 Perfomance of CCE and DRRE initiatives by organizations

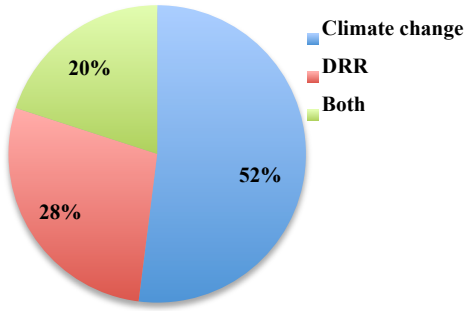


Figure 3.10 Topics of initiatives related to DRRE

The following part will describe the activities of these programs and projects and their contribution to the establishment and implementation of DRRE.

3.3.1 Governmental programs

3.3.1.1 Initiatives by the MoET

At national level, the MoET has made the instruction document for preparation and actions response to disasters annually. The direction is often issued at the beginning of the academic years or at the beginning of the disaster seasons to remind school,

educational institutions and other educational offices about disaster prevention, response and recovery.

The MoET has employed the Child Friendly School from primary to secondary level, which is further preparing the ground for effective DRRE implementation. One of the salient features of the program is its target to provide "fundamental learning conditions" whereby all schools are obligated to find way to provide quality learning especially to the most at risk students. The Child Friendly School in Vietnam was defined by MoET as followed the five standards:

1. Proactively inclusive, seeking out and enabling participation of all children and especially those who are different ethnically, culturally, socioeconomically and in terms of ability;

2. Effective academically and relevant to children's needs for life and livelihood knowledge and skills;

3. Healthy and safe for, and protective of, children's emotional, psychological and physical well-being;

4. Gender-responsive in creating environments and capacities fostering equality; and

5. Actively engaged with, and enabling of, student, family and community participation in all aspects of school policy, management and support to children.

(Source: MoET, 2008)

Besides, there were also some programs and projects related to DRRE carried by the MoET such as inclusion of environmental protection into national education systems, program "strengthen the infrastructure capacity for school", educational project targets poor primary school children, project to create access to secondary education for the students in remote areas (MoET, 2009).

Besides, in 2010, the MoET has promoted the Action plan for integration of climate change into the curriculum. The outputs of this project are (1) the set of textbooks, training and learning materials (curriculum and extra-curricular activities) on climate change for all education levels and training levels; (2) the set of training materials to train administrative officers, teachers, lecturers, students; (3) recommendation on the target, content and solutions of the education sector to respond to climate change in the future in order to build new education programs; and report on the experience of the education

sector on climate change in other countries. As part of the Climate Change Education (CCE) program, MoET (2011) has made commitment to carry out tasks related to CCE as the following:

- Introducing education programs for children, which focus on responding and adapting to impacts of natural disasters and climate change through a new education development strategy for the period 2011-2015.
- Developing education materials on prevention and mitigation of disaster risk for primary school students.
- Developing education materials on injuries prevention measures (including advocacy, education, intervention, remedy, accidents and injuries risk reduction) for use in secondary education and conducting the pilot teaching in 120 schools in 10 provinces and cities.
- Developing related education materials and directing schools nationwide to implement the tasks of environmental protection in general and climate change in particular.
- Directing localities to build the model of "safe school for injuries prevention".
- Mobilizing school teachers and staff to take part in activities such as advocacy and education to raise awareness on school safety, injuries and disasters prevention through brochures, banners, posters, slogans, extracurricular activities, intervention to minimize the risk of accidents, injuries and reduce the harmful effect of natural disasters in schools.
- Developing swimming instruction program for all school students.
- Advocating information on environment, climate change and civilized lifestyle, personal hygiene and environmental sanitation.

At the same time, MoET highlighted the important role of cooperating with other organizations in implementing CCE:

- Coordinating with United Nations Children's Fund (UNICEF) and Save the Children to organize training on education in emergencies for core officials of MoET and local authorities to enhance their capacity in preparing for, coping with and overcoming natural disasters, in order to ensure education during emergencies.

- Coordinating with UNICEF to develop the tools for assessment and information management of education in emergencies (pre-, during and post disasters).
- Coordinating with UNICEF, UNESCO and Save the Children in developing the tools for school self-assessment for pre- and post disasters.
- Collaborating with Oxfam and Save the Children to launch a contest to learn about climate change for pupils and students across the country. The outstanding products from the contest (out of 20,000 competitive entries from 21 provinces and cities) were then compiled into a book "Call to Action - The look of the young on climate change". MoET will use this material for the advocacy and education at schools in terms of awareness raising on climate change in line with the National Target Program on Climate Change.
- Working with UNICEF on an annual basis to develop the list of relief supplies and to rescue in time school students and teachers at the most affected provinces in case of natural disasters.

(Source: MoET, 2011)

Regard to the materials on DRRE, textbook for DRRE is not available and will be published before 2016. However, reference materials that were done in cooperation between MoET and other organizations are numerous. For example, the set of three books of "", "Teacher's manual on climate change adaptation", "Teacher's manual on disaster risk reduction education" (Figure 3.11), which were developed by the Centre of Live and Learn for the Environment and Community (Live & Learn), in support of the Joint Advocacy Network Initiative (JANI) and were funded by ECHO. The MoET has approved these books as resources aiming to help teachers and educational practitioners teach children about climate change, climate change adaptation and DRR. Through interactive lessons that use participatory teaching methods, students are equipped with information on disasters as well as the skills required to mitigate potential impacts of disasters such as cyclones, drought, earthquakes, floods, landslides, tornadoes, tsunamis and volcanoes. The resources are timely contributions to support the implementation of the Education Sector's Action Plan for the Vietnam National Strategy, for the period of

2011-2020 (Live and Learn and MoET Vietnam 2012a; Live and Learn Vietnam and MoET Vietnam 2012; Live and Learn and MoET Vietnam 2012b)

Figure 3.11 Reference books on CC, CCA and DRR by MoET

3.3.1.2 Initiatives by other governmental organizations

In 2009, the Disaster Management Center, which belong to MARD, has promoted the program on "Community awareness raising and community based disaster risk management" followed by the decision No. 1002 /QD-Ttg/2009. The main objectives of the program are to raise community awareness and effectively organize the model of community base disaster risk management for all levels and line agencies, particularly for the local authorities and residents at the village and commune levels. In 2011, the Ministry of Information and Technology (MoIT) has developed communication programs using multi-media (such as printed newspaper, radio, TV, online newspaper) serving as propaganda to raise awareness about climate change and disaster risk reduction.

3.3.2 Initiatives by international organizations

In 2005, GIZ Vietnam has carried out the project of "Adaptation to Climate change through the Promotion of Biodiversity", which is financed by the Federal Ministry for the Environment of Germany. It targeted communities and school teachers and students, which tried to raise awareness of people on environmental protection, sustainable use of natural resources, and the promotion of biodiversity. The main approach is through curriculum (using the three subjects of Biology, Geography and Civic Education) and extra-curricular activities (using events such as green and clean days, environmental

drawing competitions, the bird sanctuary visits, etc.). As a result, the projects benefited teachers and students from grade 1 to 12 of 154 primary schools, 74 secondary schools and 19 high schools in Bac Lieu Province.

In 2011, the UN Women has promoted the project in enhancing the capacity of women to respond to climate change and disaster events. The project has been practiced in 9 communes in Phu Yen Province and 5 communes in Binh Dinh Province. The main objectives of the projects is to enhance the participation of women in making decisions on climate change impacts and responses, especially around DRR and DRM at the grassroots level; to raise awareness and change behavior on DRR for women; to increase the capacity of women to respond to climate change: empower local women to respond to disaster events. The project has organized 51 training classes of DRR and integrated disaster and climate change into the content of activities of local Woman Union.

Another project that specifically focus on education for DRR at school level was carried out in Da Nang City, which is implemented by SEEDS Asia and funded by JICA. The project aims to build the network of disaster education among schools and related organizations, and to enhance capacities of school DRRE in Da Nang city. The main outcomes of the projects are: (1) Core Schools for Disaster Risk Reduction (DRR Core schools) are established in every district of Da Nang city; (2) DRR Core Schools build a network on DRR; (3) More than one teacher in all schools are capable of conducting disaster risk reduction classes; (4) Teachers and related governmental officials enhance their knowledge of DRR education in Thua Thien Hue Province and Quang Nam province; (5) A module for in-service teacher's trainings is developed; and (6) shared experiences and outcomes with a variety of disaster-related organization staff.

In 2012, Live and Learn cooperated with British Council in Vietnam has made lot of effort in introducing climate change and DRR education into secondary school system in Hanoi, Quang Ninh, Hai Phong, Danang and Ho Chi Minh City. Aside from developing participatory multi-media materials (video, website) on 'child/youth and climate change', the project focused more on developing educational materials on climate change and disaster education as reference and resources for taking climate and disaster prevention actions at schools and communities. It included various activities such as training to resource teachers and active youth clubs on climate change education, organizing extra-

curricular activities for students using the educational materials with the help from the resource teachers and volunteers from youth clubs, establishing the child-led forum/network at school and communities on climate change adaptation and mitigation, running a competition for every school taken part in the project to motivate them throughout the year and to identify good initiatives to support and potential cascade, giving small grants for children led initiatives on climate change adaptation and mitigation, and utilizing the British Council schools online platform to promote different initiatives.

3.3.3 DRRE initiatives by NGOs

The integration of DRR into education has been concerned in Vietnam since late 1990s. In 2001, the Vietnam Red Cross Society (VNRC) has put an emphasis on disaster preparedness activities and implemented a programme named "Introducing Disaster Preparedness in Primary Schools". The programme's activities have been replicated since then and were under way in all 21 of the most disaster-prone provinces in Vietnam, aiming to reduce disaster risk among school-going children who are among the most vulnerable to disasters. Targeted beneficiaries were teachers and children as well as VNRC staff and government personnel. The programme developed a new package of disaster preparedness training material for Red Cross personnel, community leaders, teachers and children; also involved the active participation of relevant stakeholders, including teachers and children, in writing and finalizing the training and learning material (UNESCO 2009). The 12-month Programme had the following specific objectives: (1) developing disaster needs assessment material and training national and provincial trainers and district and commune personnel in some 30 communes in a 12-month period; (2) developing commune-level disaster preparedness material and training Community Development Boards in some 30 communes in a 12-month period; (3) developing disaster preparedness material for Grade 4 and 5 school children and training trainers, school teachers and children in some 210 communes in a 12-month period. Recipient schools in disaster-prone areas organized inter-provincial competitions including drama, quizzes and painting competitions built around a disaster preparedness booklet and disaster preparedness teaching. However, the programme faced a major challenge in trying to integrate a disaster preparedness component into the official

training curricula without overburdening school children. This challenge has not yet been overcome although the VNRC insisted providing disaster preparedness training until 2010 to teachers and children in eight coastal provinces in northern Vietnam with financial support from the Japanese Red Cross. As a result, the programme and its subsequent replication have helped train 15,000 teachers and over 500,000 school children over the last six years. (UNISDR 2007).

In addition, one of the great contributions in making integration of DRR into schools has done by Development Workshop France (DWF) in Hue Province in 2008. DWF has an ongoing partnership with communes in Hue Province to strengthen existing public infrastructure and build safe new schools, markets, and health facilities. At village level, DWF has worked with communes to build safe kindergartens and to strengthen and build primary schools so that children learn about safety and safe construction techniques in an exemplary safe environment and take these principles back to their families. DWF trains teachers about disaster prevention, and runs workshops with children about disaster prevention and about the child's role and needs before, during and after disasters. Children are active in school and in the community in promoting the vulnerability reduction message (DWF 2009).

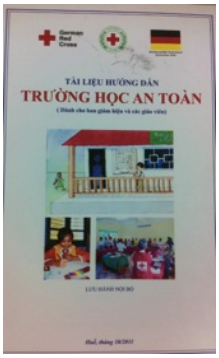


Figure 3.12 Publication from the projects implemented by Development Workshop France (DWF) in Hue Province in 2008

Figure 3.13 Publication from the projects implemented German Red Cross (GRC) cooperated with Vietnamese Red Cross (VNRC) since 2010

There were other projects implemented in Hue Province such as “Integrated Disaster Preparedness in Thua Thien Hue Province” by German Red Cross (GRC) cooperated

with Vietnamese Red Cross (VNRC) in 2010, “Partnership for community action on climate change” by the Centre for Development of Community Initiative and Environment (C&E) and Global Action Plan International (GAP) in 2011. The project has taken schools as a hub for sustainability actions by households and communities, engaging teachers in civil society, linking schools and students with existing Vietnam government programs and priorities, linking with existing Swedish government programs and priorities, building partnerships between organizations. The activities included raising awareness of lower secondary school students to perform actions related to climate change; carrying out community outreach (family, school, neighbors) through the practice of Eco-team’s sustainable projects and activities, establishing "Green living model" at schools. The outcomes of the project were materials for community climate action through schools were developed for Vietnamese rural and urban contexts; teachers and youth leaders/facilitators received training to engage students in climate action; community climate actions were facilitated by schools; eco-team models were shared and advocated in project sites; links to international development and learning about climate actions and ESD are strengthened. Besides, a household-level model of climate mitigation has been adapted including teaching materials, materials for students, and a process to mainstream content into the curriculum. The project has benefited 3,000 students, 500 junior secondary students, 93 teachers, 50 VNGO staff have participated and received training, 20 education and sustainability decision makers are trained in Hanoi, Thua Thien Hue, Thai Binh.

In Da Nang, there were numerous projects and programs related to DRRE carrying out in the city: the project “Strengthening disaster preparedness on commune level in Da Nang City” funded by German Federal Office in 2009; the project “Communicating climate change risks for adaptation in coastal and delta communities” by Asian Management and Development Institute (AMDI) from 2012, the project “Building resilience to climate change in urban areas through integrated education” funded by Rockefeller Foundation and implemented in cooperation between Institute for Environmental and Social Transition (ISET) and DoET Da Nang in the duration of 2012-2014.

3.3.4 DRRE initiatives by other organizations

Other organization from social organizations, private organizations, academia and media have also contributed to the promotion of DRRE. In 2010, the Youth Union of Information Technology Department in Hanoi University has developed of the software "Awareness education for youngsters on climate change responses" which can be accessed both online and offline. This is a good channel to provide knowledge of climate change and disaster impacts for Youth Union members. The website "What do youngsters do for climate change?" This site provides activities such as writing and drawing competitions with content reflecting the methods and responsibilities of individuals and organizations in response to climate change and disasters.

It is interesting that the integration of climate and disaster issues is also done with the Mathematics. The project has been carried out by Kien Hung Secondary school in Ha Noi with financial support from the World Bank. It provided about 40 mathematics questions involving climate change topics. The result from the project has been shared with other schools and replicated in other provinces.

3.4 Key findings

The increasing damages of natural disasters, in particular climatic disasters such as typhoons, floods, droughts, and heat waves threatens the development of all sectors in Vietnam. In particular, the impacts of natural disasters on education sectors affects thousands of students and teachers, which causes educational interruption and significantly reduces educational quality. Education, therefore, is being viewed more essential in the effort of reducing risk and strengthening people capacity to responses to disasters.

Analysis on the policy related to education and disaster risk reduction proves that Vietnam has set up strong legal and institutional basis for DRRE. The national government has emphasized the essential role of education sector through a number of legislative documents (NS-NDPRM in 2001 and 2007), in particular the National Action Plan for the Education sector to response to disasters has been in place. The Action plan has shaped the DRRE practices by defining the ten tasks need to be implemented which mainly covered schooling such as curriculum, training, instruction, organization, and

professional development. MoET is the central focal point for the implementation of DRRE in practice. Under MoET, Department of Infrastructure, School equipment and Child toys and Department of Science and Technology are two most important agencies mainly responsible for DRRE implementation. While Department of Infrastructure, School equipment and Child toys take into account the tasks related to educational governance, such as establishing Steering Committee, policy interventions, and structural measures. Department of Science and Technology plays a key role in facilitating educational activities, particularly integrating DRR into education and training activities. In addition, the plan also involves various stakeholders from different Departments under MoET, MARD, MoC, international organization, etc. However, cooperation among departments within MoET and between MoET with outside organizations in the effort of implementing DRRE needs more enhancements.

Besides, in order to promote effective DRRE practices, the government has developed different projects on DRRE; for example, the project "Integration DRR into education sector" has been accepted recently, in 2012. The foci of DRRE initiatives are mainly focus on raising awareness for educational officials, educators, teachers and students. It also stresses on the importance of school safety ("Developing disaster resistant schools" project), as well as the importance of development of DRR curriculum ("Integration of DRR into national curriculum" project). In order to have a better translation of DRRE related policies at local level, the specific guidelines on DRRE are needed to reduce variation amongst regions. Consistency between DRRE policy and relevant policies at different levels helps to ensure the local work in track with the national guidelines. Authoritative support especially from local government and community is critical yet insufficient for an effective DRRE.

In order to carry out the important projects that have been set out in the action plan, efforts on review current DRRE initiatives are crucial in term of lesson learnt and good practices. DRRE in Vietnam has formed and implemented even before the issuing of the National Action Plan on DRR in the education sector. At that stage, DRRE initiatives were mainly implemented by NGOs and other organizations than governmental organizations. Besides, since the local communities has prepared, responded and recovered from natural disasters using their own wisdom and knowledge, which pass

from generation to the next. The indigenous practices, to an extent, can be seen as one of the first initiatives of DRRE, and will be a valuable source contribution to the community and school education for DRR.

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Chapter 4 Building school disaster resilience in Central Vietnam

Chapter 2 and 3 gives the evidences of the good practices in reducing disaster risk and building educational resilience. This Chapter is an attempt to examine on how level of educational resilience can be assessed by using the School Disaster Resilience Assessment (SDRA) tool. The SDRA was developed base on reviewing the Climate Disaster Resilience Index (CDRI) and the 16 tasks of Hyogo Framework for Actions designed specifically for education sectors. Findings from the study provide important insights for the enhancement of educational resilience through the implementation of Disaster Risk Reduction Education (DRRE), which comprises both educational governance and education activities in school. Case studies from primary education in Thua Thien Hue Province and Da Nang will be presented. Besides, comparison between results of the two study areas provides concrete evidences for strengthening resilience of schools located in different geographical regions.

Contents

BUILDING SCHOOL DISASTER RESILIENCE IN CENTRAL VIETNAM

4.1 Introduction

The concept of educational resilience has been widely recognized and acknowledged by many researches and practitioners in the field of disaster risk reduction (as described in Chapter 2). Together with the recognition on the vital roles of education in disaster preparedness and response, building resilience for education sector is therefore a crucial task in the effort of reducing risk and protecting people's lives. In particular, school education, as its services reach a large number of people from the primary age children to junior and senior secondary school students, will be an effective tool for the wide spreading of knowledge on disaster and disaster risk reduction. School students are considered amongst the best agents for wide spreading disaster and relevant information to their family and community, especially for primary age children. As they are the first in their family and community to attend school, more attention on their learning and other activities will be paid by family and community. Evidences from literature review in Chapter 2 also illustrate international and national priority on primary education compare to secondary education, mainly due to its perceived role in mitigating different social issues (Kadzamira and Rose 2003). Aside from the effort on Universal Primary Education (UPE) by 2015 set in the Millennium Development Goals, primary education is also considered as important means of achieving developed economic, increasing agricultural productivity, improvements in health, as well as many of the other development goals (Colclough 1982, Lewin 1993, World Bank 1995, Kadzamira and Rose 2003). This study, therefore, targets on primary education and contributes to advance an understanding on the implementation of DRRE practices from primary schools.

Education for disaster risk reduction is an interdisciplinary subject. Thus, important attention has been paid on the interrelationship between internal and external factors, between socio-economic condition and natural conditions. The Hyogo Framework for Action (HFA) 2005-2015, in order to achieve its goals in implementing education for disaster risk reduction at local level, has identified a

number of tasks including awareness raising programs on disaster risk reduction, integration of disaster risk reduction in the education system, disaster risk reduction training, dissemination of disaster risk reduction information (UNISDR 2007a). To an extent, mainstreaming of disaster risk reduction in the curriculum only is not enough to bring about meaningful risk reduction. Implementation of disaster risk reduction education should also cover issues such as structural and non-structural safety, legislative basis, management mechanism, qualified human resources, sufficient funding, strong collaboration, proper warning system, and risk assessment, among others. Therefore improvement of education resilience through implementation of DRRE not only focuses on teaching and learning about disasters, but also on educational governance on disaster risk reduction.

Within this context, the study seeks to develop a comprehensive methodology that considers the multi-dimensional aspects including physical conditions, human resources, institutional issues, external relationships, and natural conditions. The methodology named School Disaster Resilience Assessment (SDRA) is formulated base on climate disaster resilience indexes and the 16 tasks of HFA designed for the education sector (Gwee *et al.* 2011). It aims to measure the capacity of primary schools to prepare and response to climate related disaster. Findings from the study provide important visions into enhancing resilience of the primary education system at the school, city, and provincial levels. By giving the overall pictures of existing conditions, it provides the School Management Board with a means to assess the school's capacity as basis to set out priorities for DRRE practices. In this way, SDRA helps policy-makers and practitioners in the development of an effective plan to increase the level of educational resilience.

In this chapter, the step-wise process to develop SDRA methodology is described. Justification on selection of indicators and variables will be discussed. The tool SDRA is applied in a questionnaire to collect data on resilience capacity of all primary schools in Hue Province and Da Nang City. The main reasons for selection of these two areas are due to their vulnerability to climate change and climate related disasters and their similarity in topography yet differences in socio-economic development. Results from the assessment of existing school resilience in Hue Province and Da Nang City will be input for the planning process on DRRE in Chapter 5, for the teachers' perception assessment on Chapter 6, and for the

discussion part on implementation of DRRE as well as building educational resilience in Central Vietnam in the later part of this thesis.

4.2 Methodology

This section discusses the selection and development of set of indicators for measuring the level of educational disaster resilience. The later part will discuss the application of the SDRA in questionnaire survey to collect data, scoring process and data analysis.

4.2.1 Development of SDRA

In the disaster risk reduction field, there is a consensus that resilience is a multifaceted concept which includes elements on social, economic, institutional, infrastructural, ecological, and community dimensions (Cutter *et al.* 2010). Using a set of indicators to measure climate resilience, Sivell *et al.* (2008) proposes three aspects of sustainability: social, economic, and natural/environmental. Joerin and Shaw (2010) suggest five dimensions namely physical, social, economic, institutional, and natural which are important in assessing climate disaster resilience. Another set of indicators developed recently to measure baseline conditions leading to disaster resilience within communities also focuses on the five components of social, economic, institutional, infrastructure resilience, and community capital (Cutter *et al.* 2010). In addition, there are many initiatives that are implemented as responses to the UN Decade of ESD's (2005) call to integrate the principles, values, and practices of sustainable development into all aspects of education and learning to address the social, economic, cultural, and environmental problems of the first twenty-first century (UNESCO 2005).

Adapting the 16 tasks of HFA for the education sector developed by Gwee *et al.* (2011), this study defines the five dimensions on the measurement of climate disaster resilience of schools based on the local context of Central Vietnam including physical conditions, human resources, institutional issues, external relationships, and natural conditions. Because of the unique characteristic of the public education system as being a non-profit entity, economic issues are excluded.

The second step in this method is selection of variables that are representative of the general conditions influencing resilience and are compatible with the local context of the primary education system in Central Vietnam. As mentioned in several

Table 4.1 Parameters and variables used to measure disaster resilience of schools

Dimension	Parameter	Variables
Physical condition	School building (P1)	Regular check on school building
		Safety building code
		Emergency exit door
		Evacuation shelter
		Damage of infrastructure by disaster
	Facility and equipment (P2)	Regular check on facilities and equipment
		Damage of facilities and equipment by disaster
		Emergency supply (emergency bag, storage food, water,..)
		Renovation/repair damaged facility and equipment
		Eco-facilities/equipment system
	Hygienic and environmental condition of school (P3)	Environmental protection campaign
		Regular check on hazardous material
		Food safety condition
		Collected garbage
		Recycle system
Human resource	Teacher and staff (H1)	Affected by disaster
		Knowledge about disaster
		Disaster training program for teacher and staff
		Participation in disaster program
		Sharing of disaster preparedness plan for teacher and staff
	Student (H2)	Affected by disaster
		Knowledge about disaster
		Disaster training program for student
		Participation in disaster program
		Sharing of disaster preparedness plan for student
	Parents/Guardian (H3)	Parents-Teacher Association meeting
		Disaster training program for Parents
		School-home emergency notification
		Sharing of disaster preparedness plan for Parents
		Involvement of Parents in disaster activity
Institutional issue	Planning (I1)	Incorporation of disaster components into school planning
		Incorporation of disaster components into school regulation
		Incorporation of disaster components into school syllabus
		Preparedness and emergency management plan
		Recovery management plan
	Management (I2)	School early warning system
		Disaster information
		Disaster activity

		Disaster group
		Training for disaster group
	Budget (I3)	Budget allocated for disaster training activity
		Budget allocated for disaster preparedness and response
		Budget allocated for renovation/repair/rebuilding after disaster
		Budget allocated for monitoring
		Budget allocated for supporting the students who have special need
External relationship	Collaboration (E1)	Meeting with local DoET
		Meeting with local People committee
		Communication system
		Early warning from local government
		Collaboration with local government
	Relationship of school to community (E2)	Location of school in local community
		School used as evacuation shelter for local community
		Participation of school in disaster activities held by local community
		Support from local community
		School involvement in disaster management plan of local community
	Mobilizing fund (E3)	Fund from local Government
		Fund from Parents Association
		Fund from local community
		Fund from other organizations
		Shifting budget
Natural condition	Severity of natural hazards (N1)	Flood
		Storm (strong wind)
		Heat wave
		Sea intrusion
		Drought (water scarcity)
	Frequency of natural hazards (N2)	Flood
		Storm (strong wind)
		Heat wave
		Sea intrusion
		Drought (water scarcity)
	Surrounding environment (N3)	Location of school in high risk area
		Distance to nearest river/stream/sea
		Distance to local government office
		Distance to police station
		Distance to hospital/health center

international and national agendas, frameworks, conferences, as well as UN programs, disaster risk reduction education is a multifaceted issue which encompasses far more than school curriculum but school safety, risk assessment, availability of human resources, collaboration, and network among stakeholders, etc. In this part, the physical conditions, human resources, and external relationships are generalized for other areas while the institutional issues and natural conditions are specific to Central Vietnam. The institutional issue in this study is embedded within school context, thus it reflexes how school manages itself in the improvement of disaster resilience under the local context of culture, history, and development. Also, the natural dimension is developed along with the natural conditions of Central Vietnam, which is prone to disasters such as flood, typhoon, heat waves, sea intrusion, and drought. Table 4.1 shows the set of indicators including the five dimensions of human resources, institutional issues, external relationships, and natural conditions, and each of them is further explained by three parameters and fifteen variables.

4.2.2 Selection of parameter and variables

4.2.2.1 Physical condition

Physical condition is defined by three parameters including *School buildings*, *Facilities and equipment*, and *Hygienic and environmental conditions*

School building provides an overall structural assessment in terms of the regular checks on school buildings, application of safety building code, existence of emergency exit doors, and quality of evacuation place. There is a growing awareness on the importance of school design due to huge negative impacts on education caused by the malfunction of school buildings' structure and facilities during a disaster. The disaster risk reduction Begins at Schools Campaign implemented by UNISDR in 2006–2007 emphasizes on promoting safe construction of school buildings (UNISDR 2007b). Accordingly, the Coalition for Global School Safety and Disaster Prevention Education (COGSS) takes disaster-resistant school infrastructure as one among four main areas to focus on (COGSS and DPE 2008). Furthermore, school building safety is one of the first priorities clarified in the Children's Charter where children prioritize education, want their schools to be safe places, and do not want their education to be interrupted after disasters (UNISDR 2011). As mentioned in the Guidance notes on safer school construction, the use of the school will be affected if a school is built

above flood elevation, yet access routes are inundated. Evacuation routes are, thus, equally important to ensure people are not trapped in school buildings (INEE and GFDRR 2009). In addition, previous disaster's damage to infrastructure is assessed to understand the current level of damage and is linked to their capacity to sustain and recover from future disasters.

Facilities and equipment tests the physical conditions of non-structural infrastructure. The importance of risk assessment and risk identification in raising awareness and enhancing knowledge base on the local context has been highlighted in the Priority 2 of HFA (UNISDR 2007a). Carrying out regular check on facilities and equipment is very important for teachers and students to understand their school's situation and potential risk toward a disaster. Similarly, the provision of emergency supplies as well as eco-equipment system is highlighted. This parameter also examines the previous damage to school facilities and equipment and the speed of recovery process, which are calculated by the time required to restore a school system to pre-disaster level of functionality.

Hygienic and environmental condition of school measures the school's awareness on environmental problems through the environmental protection campaign held in school. Petal (2009) mentions that the mission of education about disaster is to convey and understand the natural and environmental conditions as well as the human action and inaction that lead to disaster. Besides, it is necessary to properly check and arrange for hazardous materials before a disaster occurs in order to enhance safety and minimize economic losses during an event. Moreover, the hygienic conditions in school with respect to food safety, garbage collection, and recycle system are assessed, as these will pose a greater threat to student health if not treated well before and after a disaster. The importance of maintaining hygienic conditions in school to reduce risks associated with disasters is recognized, especially in drought or water scarcity areas (UNESCO, 2013). Also, hygiene is one among key areas addressed in education in emergency aside from HIV/AIDS or landmine safety (Nicolai 2003).

4.2.2.2 Human resource

Human resource examines the main factors that affect teachers and students' resilience. Parents are also included in the *Human resource* dimension as it has both close relationship with schools and huge contribution to the improvement of students' achievement.

Teacher and staff assess the personal capacity of teachers with regard to previous disaster, their knowledge, and their role in responding to disasters. It is necessary for teachers to have adequate knowledge of disasters to be able to conduct proper disaster education. Providing teachers, students, and Parents/guardians the knowledge on disaster risk reduction is therefore a good way to minimize loss in human resources as they can protect themselves and each other from the impacts of disasters.

Student identifies critical issues, which need to be addressed in order to enhance effectiveness and efficiency in student learning capacity. It is explained in the Priority 3 of HFA that in order to build a culture of safety and resilience, there is a need to develop disaster training programs and enhance dissemination of disaster risk reduction information to stakeholders (UNISDR 2005). In terms of formal education, it is widely acknowledged that school plays an important role in raising awareness among students, teachers, and Parents (Shaw and Kobayashi 2001). Also, high level of participation of students in disaster activities can create greater resilience in school.

Parents/Guardian addresses the role of Parents participation in disaster activities in school. The importance of linking school education with family and community education is increasingly being recognized and currently practiced in some countries through engagement of students in a more proactive partnership (Shiwaku and Shaw 2008). According to Vandergrift and Greene (1992), the concept of parental involvement with the student and school is essential and can produce great rewards for all concerned. About 86 per cent of the general public schools believe that support from Parents is the most important way to improve student achievement (Rose *et al.* 1997). With regard to emergency, the interaction between schools and Parents via school-home emergency notification is a prerequisite to protect students from the impacts of disasters.

4.2.2.3 Institutional issue

Implementing the first priority of HFA requires a mechanism to strengthen institutional issues for disaster risk reduction. It involves integrating disaster risk reduction into planning, decentralizing responsibilities, assessing human and financial needs, and allocating necessary resources (UNISDR 2005). Under a school context, *Institutional resilience* is assessed using three parameters of *Planning*, *Management* and *Allocation of budget* for disaster activities.

Planning is the yardstick that measures achievements of school in responding to disasters. Schools that incorporate disaster risk reduction into school planning, regulation, and syllabus and provide enough information related to disasters for students demonstrate a higher level of resilience than schools without these characteristics. Similarly, a good preparedness and recovery management plan will help schools both quickly recovery from disaster and enhance safety for students, teachers, and staff.

Management focuses on what school provides for students before disaster in terms of early warning system, disaster activities, easily understandable information on disaster risks, and protective measures. As people often learn about disaster indirectly from another experience, disaster activities such as drawing, telling a story about disaster will build a culture of sharing information and knowledge transfer, which in turn raise students' awareness on disasters thereby reducing risks. Furthermore, the creation of a disaster group and their activities in responding to disasters are highlighted for disaster activities such as disaster training, preparedness, response, and recovery process. Many studies using indicator-based approaches limit analysis to generic information by assuming a vulnerable population that is homogeneous, and neglecting the vulnerable agents with cognitive abilities to adapt to changes in their environment (Acosta-Michlik and Rounsevell 2009). To avoid this limitation, this parameter also considers students who have special needs by way of how much support schools give them when disaster occurs. According to the guideline for education in emergency, education should play a critical role in caring for vulnerable populations such as girls, children with disabilities, or those from ethnic minority communities. Ideally, services should include all children, with special efforts made to ensure access to schools for disadvantaged or vulnerable groups. This is particularly important when the emergency increases children's vulnerability (eg, landmines/violence create disabilities, ethnic groups are targeted) (Nicolai 2003).

4.2.2.4 External relationship

External relationship dimension is examined using the parameters of *Collaboration*, *Relationship of school to community*, and *Mobilizing fund*, which will be described more in details in the following part.

Collaboration refers to the cooperation between school, community, and local government, which proves necessary for both pre-disaster prevention and mitigation, and crucial in post-disaster management. Also, facilitating networking and collaboration among stakeholders is considered as important factor to ensure sustainable in the education sector (UNESCO 2005). An important aspect of regular meeting between school, local DoET, and local community is to bring together school managers and policy-makers at the local level to assess disaster damage, to learn from last disaster, and plan for future disaster.

Relationship of school to community identifies the role of community in helping schools to respond to disasters in a timely manner. The vital role of community in disaster risk reduction education has been shown in leading students' actual actions in case of emergency to reduce disaster risk (Shiwaku *et al.* 2007) and facilitating the link between risk perception and risk reduction behavior (Paton and Johnston 2001). It has been re-emphasized in the Islamabad Declaration in 2008 which strongly encourages community participation in school's activities since the community is the first responder to disaster situation and is a partner who allows transfer of knowledge and practices (Islamabad Declaration on School Safety 2008). On the other hand, school plays a central role in the community. Besides providing basic education, school supports the community in times of emergency by serving as evacuation center, and has potential to act as knowledge resource centers and engines of disaster risk reduction work in the community. Shiwaku and Fernandez (2011) also stress the importance of linking school education with community education, and engaging students in more proactive partnership with the neighborhood.

Mobilizing fund examines the external support from community, local government, and other organizations to schools in case of disasters. For this, political support in funding for education after a disaster is highlighted and deemed important to help school quickly recover and resume back to normal operation. There is growing evidence that proves children benefit directly and indirectly from even very small cash transfers (Save the Children 2008). On the other hand, Sivell Sivell *et al.* (2008) suggest that it is not necessary to spend a large amount of money; instead, shifting budget or changing how existing funds are distributed can be very effective in building resilience.

4.2.2.5 Natural condition

Human suffering has multiplied in recent years due to increased frequency and intensity of natural hazards, which are expected to rise in the coming years due to climate change. The hazard agent itself will influence resilience capacity. It will, in part, dictate appropriate preventative measures, as well as the types of losses and needs which may occur, and therefore the types of assistance measures, which may be required (Guidelines for Assessing Resilience and Vulnerability in the Context of Emergencies 2000). Therefore, this study also considered the *Severity and Frequency of natural hazards*, which rates the level of impacts of climatic disasters on schools. Since Central Vietnam is more vulnerable to climatic disasters including flood, storm, heat waves, sea intrusion, and drought (water scarcity) than other kinds of disasters such as earthquakes and volcanic eruptions, this study focuses mainly on the impacts of climate related disasters to the education sector.

Severity of natural hazards defines the level of climate related disasters occur in the recent five years. The reason for testing the magnitude of an event is that different scales of disaster result in different damages to education sector, thus decide different contents on disaster risk reduction to be taught in schools. A devastating disaster, for example, will destroy school buildings, increase the number of dead and missing, and cause huge losses in economy and thus increase time for recovery and put more pressure on educational continuity.

Frequency of natural hazards measures the frequency of climatic disasters in the local area of school. Depending on the nature of the hazards, the approach of disaster risk reduction education should be changed accordingly. Shaw et al. (2004) proposed different approach should be applied for earthquake compared to other types of disaster. They suggested that the only way to reduce damages caused by an earthquake is effective preparedness while hydro-meteorological disasters such as floods and typhoons are much related to early warning and risk communication (Shaw *et al.* 2011). Besides, in order to develop a comprehensive policy toward school safety, the governments should consider all locally relevant hazards and school location as schools often function as evacuation centers in the time of disaster.

Surrounding environment examines the school's surrounding area in terms of the school location in high-risk area and the distance from school to public service agencies such as government office, police station, and health center. It is clear that

schools located in hazardous location are prone to rapid and severe disasters and can easily be isolated during a disaster.

4.2.3 Data collection

The third step in this method is the use of the selected indicators in formulating a questionnaire (see in Appendix 1), which covers five dimensions with each dimension consisting of three parameters. Each parameter then is defined by other five selected variables which help to provide an understand on the current conditions of school, damages caused by disasters, as well as capacity of school to prepare and response to disaster. In order to draw value from each of variables, five ordered response levels are used. As according to Dawes (2008), a 5- or 7- point scale may produce slightly higher mean scores relative to the highest possible attainable score, compared to those produced from a 10-point scale, and this difference was statistically significant. In this study, the five response categories represent an ordinal level of measurement, which will be later encoded into numerical value from one to five during the data processing. These five scales or five numbers indicate the relative position of items, but not the magnitude of difference. The questionnaire was designed to elicit information from both quantitative and qualitative metrics. Of 75 questions, 30 questions (40 per cent) employ qualitative metrics, which measures the opinion of school principal on the conditions or capacity of school to prepare and response to disaster. In order to minimize the gap of understanding among responders and narrow the variation of self-interpretation, an explanatory note (see in Appendix 2) was prepared to describe each point of the qualitative scales in different questions. To make the explanation on the qualitative scales exact and clear, the author tried to utilize relevant policy, regulation, norms, etc. to explain the scales. For example, to define severity of storm, wind level is examined based on the Vietnamese national scale, which was mainly modified from Saffir-simpson scale. Another example to define the level of food safety in school is the number of items on food safety standards developed by the Ministry of Health was used. For other matters that are not officially defined or regulated, the author tried to find alternatives that can be quantitatively measured yet still keeping the same meaning or can represent the original one. For example, in order to qualify capacity of emergency supplies in school, it counts on the number of students and teachers can receive emergency supplies during disaster happens. As such, the service is defined as *poor* if its capacity limits to 25 per cent of the total

number of students and teachers, *medium* if it can serve up to 50 per cent, *good* for that up to 75 per cent, and *very good* if more than 75 per cent of students and teachers will be provided emergency supplies. In this way, it helps to ensure that the meaning of five categories will be perceived in the same way to different people.

In order to collect data using the questionnaire, the author went to schools to discuss and explain the indicators and how to fill out the questionnaire with the principal or teachers who are responsible for disaster activities in school (Figure 4.1 and 4.2). Before the survey, the SDRA questionnaire was consulted with staff of the MoET and the provincial and local DoET in order to make it compatible with the local conditions of the primary education system. In order to supplement data for the questionnaire and find out the current conditions of schools, the author also used a school checklist (see in Appendix 3) during visits of schools. The checklist includes (1) items can be observed during school visit such as physical conditions such as school buildings, classroom windows, doors, stairs, toilet, school gates etc.; (2) items related to disaster activities in schools that can be extracted from the interview with school principals; and (3) the history of disaster impacts of schools which can be review from school's documents. Also, the author has collected related documents such as the decision of school principal on establishment of School Committee for Storm and Flood Control and damage reports after disasters. Furthermore, to add more information for the qualitative answers, consult with the educators, the policy-makers, the DoET staff, the school principals, teachers and students were carried out, in particular during the two internship periods in Hue and Da Nang. Secondary data from the local Red Cross, DoET, Department of Natural Resources and Environment (DoNRE), NGOs, and other organizations was also gathered.

Figure 4.1. Questionnaire survey in Thua Thien Hue Province (n=229)

Figure 4.2. Questionnaire survey in Da Nang City (n=100)

4.2.4 Data processing

The questionnaire covers five dimensions with each dimension consisting of three parameters. Each of the parameter is then represented by five variables measuring parameter in more details. As such, there are seventy five variables are selected to define the resilience of a particular educational system; whereby, each variable (x1 x2 … x5), allows five different choices with the score of 1 being the worst ranked, poor or not available/non-existent and a score of 5 being the best, very good. In addition, a weighing scheme requires that variables within a parameter, consisting of five variables, have to be ranked (w1 w2 … w5) depending on their importance (low importance [1], high importance [5]). In the same way, the parameters are weighed according to their importance between 1 (not important) and 3 (very important) in shaping the final score of a particular parameter and resilience dimension. Five dimensions are given equal weight and the overall resilience is calculated base on the average scores of five dimensions. There are some reasons that the same weight is applied for five dimensions from Physical condition, Human resource, Institutional issue, External relationship and Natural condition. Firstly, these five dimensions and its indicators are not independent but rather interrelate each other. Improvement of this dimension will possibly lead to increasing score of other dimensions. Secondly, as mentioned before that the SDRA was developed based on the framework of CDRI, which is also using the same weight for its five different dimension. CDRI was extensively applied to assess the resilience level of different urban areas in Asian countries. Results from CDRI is widely accepted and employed in various researches in the field of disaster management (Joerin and Shaw 2011, Mulyasari, F. *et al* 2012, Tong *et al* 2012)

This simple structured questionnaire with the uniform numbers for each parameter and variable ranging between one and five allows a transparent adoption of the formula named Weighted mean to calculate scores for each variable, parameter, and dimension in a standardized and harmonized approach (Figure 4.3). All collected data is analyzed using Weighted Mean Index (WMI) and Aggregate Weighted Mean Index (AWMI) formula. WMI provides the resilience score for all parameters, while AWMI provides resilience score for dimensions. As a result, the calculated value of AWMI of one dimension is the CDRI of that dimension (Joerin and Shaw 2011, Tong *et al.* 2012)

Weighted mean:

$$\frac{\sum_{i=1}^{n} w_i x_i}{\sum_{i=1}^{n} w_i} = \frac{w_1x_1 + w_2x_2 + w_3x_3 + w_4x_4 + w_5x_5}{w_1 + w_2 + w_3 + w_4 + w_5}$$

Figure 4.3 Formula – Weighted Mean for calculating a score of a parameter

Source: Joerin and Shaw (2011)

To depict resilience levels, both pentagon-shaped graphs and spatial maps were developed to be able to visually compare resilience levels between regions in the study areas. This approach is both theoretically consistent and geographically relevant. By using GIS system to locate schools, it helps in the understanding of the geographical situation of schools thereby contributing to an accurate level of data collected.

4.3 SDRA in Hue Province

4.3.1 Context of Thua Thien Hue Province

Natural condition

The complicated topography in Thua Thien Hue Province made it prone to different types of disasters, particularly floods and typhoons. The terrain in Hue is seperated by a great number of rivers, canal and lakes. The downgrade of the terrain, anf of the large-river beds are the cause of the rapid water concentration of the rivers

and the dangers of unexpectedly speedy flood tranmission in the area (Nguyen *et al.* 2007).

Thua Thien Hue Province locates in a tropical monsoon area, the average annual temperature is 25°C in the plains and in the hills and only 21°C in the mountains. The lowest average monthly temperature is in January at 20°C. The annual precipitation in the province is 3,200 mm with significant variations. Depending on the year, the annual average precipitation may reach 2,500-3,500 mm in the plains and 3,000 - 4,500 mm in the mountains. In some years, the rainfall may be much higher and reaches to more than 5,000 mm in the mountains (TTHPPC 2005).

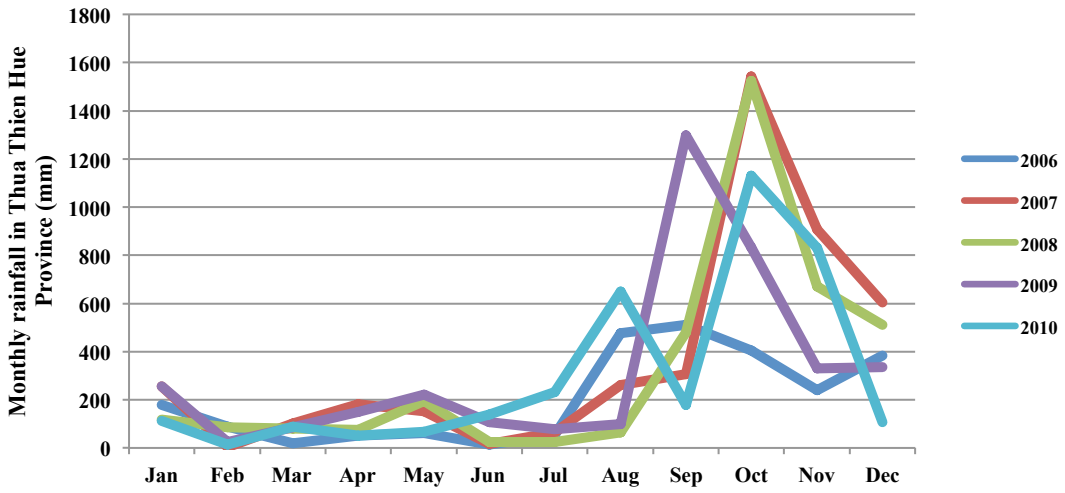


Figure 4.4 The average monthly rainfall in Thua Thien Hue Province from 2006-2010 (Source: TTHPPC (2010))

The rainy season is from September to December and takes up about 70 per cent of the total precipitation (Figure 4.4). Rainfall often occurs in short heavy bursts which causes flooding and erosion (TTHPPC 2013). In the recent year, there is an observation that the flooding season has tendency to start earlier than before (Tran *et al.* 2010). According to Nguyen *et al.* (2007), due to the coincidence of dry period with rainless season, the rainfall is not only insufficient but the vapor speed is high, which causes drought in cultivated areas during the dry season.

Population

The population in Hue Province is 1,090,879 in 2010 with 43.17 per cent located in urban areas, increased 1.5 times compare to the 29.62 per cent of urban population in 2000 (GSO Hue 2011). The distribution of population is uneven among regions, the most density are in Hue City, the coastal areas and riverside areas (Table 4.2). The

city covers the natural area of 67.8 km^2, is capital of Thua Thien Hue Province and is a politic, economic and cultural center of Thua Thien Hue Province. There are 338,094 people living in 27 wards, of which over 170.000 in the working age (TTHPPC 2010).

Table 4.2 Distribution of population by districts in Thua Thien Hue Province in 2010

			Area (km^2)	Population (persons)	Density (person/^{2})
Urban	Plain land	Hue City	71	338,094	4,763
		Huong Tra	522	113,327	217
		Huong Thuy	458	96,309	210
Rural	Coastal area	Phong Dien	954	89,029	93
		Quang Dien	163	83,538	512
		Phu Vang	280	171,363	612
		Phu Loc	730	135,225	185
	Mountainous	A Luoi	1,233	22,504	18
		Nam Dong	652	42,490	65
		Total	**5,063**	**1,091,879**	**216**

Source: TTHPPC (2010)

Natural disaster profile and impacts to education sector in Thua Thien Hue Province

Its diverse topography makes Thua Thien Hue Province one of the most vulnerable areas in Vietnam. In recent years, disasters such as floods and storms have devastating impacts in Thua Thien Hue Province (Table 4.3). Almost every area has experienced flooding, which is increasing in both number and size. Moreover, the number of storms hitting Vietnam is growing each year, especially in Thua Thien Hue Province. During the 19th and the first half of 20th century from 1804 to 1945, there were only 38 floods and typhoons in the historical record. However, between 1975 and 2000, there were 41 disasters consisting of 1 storm, 18 floods, and 22 storm floods (Do 2000). Recently, intensifying environmental degradation and its impacts on exacerbating flood damages in Hue Province has been reported (Tran *et al.* 2009). Specifically, the increasing degradation of the natural environment through deforestation and the conversion of agricultural land to urban areas has made the impact of floods more serious and longer lasting in the lowland areas in Hue Province (Tran *et al.* 2008).

The flooding event in Central Vietnam in late 1999 has been recorded as the worst flooding event that the country had experienced in a century. The flood was caused by a series of storms that brought heavy rain to Central Vietnam in October and November. Within a month, almost all provinces in the central and southern parts of Central Vietnam were exposed to two spells of torrential rains, which caused two big floods in a vast area from Quang Binh Province to Khanh Hoa Province. The aggregated rainfall was recorded at 2,500mm in Thua Thien Hue. The flood water levels on rivers in Quang Tri and Thua Thien Hue provinces surpassed the historical flood levels (flood water level in Hue was 1 meter higher than the historical level). There were 926,500 people affected, in which 467 people were reported dead and missing. Infrastructural damages including damages on schools building were vast loss due to the high level and long duration of flood (Figure 4.6). It was estimated that the total damage amounted to around 152 million USD (GoV 2005a).

Table 4.3 Estimated damages of recent disasters in Thua Thien Hue Province

	Dead and missing	Injury (people)	Affected households	Flooded houses	Affected schools	Economic loss (million VND)	Economic loss (million USD)
Flood 1999	467	94	295,100	193,627	1,207	3,040,000	152
Typhoon Xangsane 2006	8 *(4 children)*	102	12,380	48,244	429	3,640,000	182
Flood 2007	19	35	90,386	144,133	556	-	-
16/10-5/11	18	31	7,008	60,737	306	940,000	47
10-12/11	1	4	83,378	83,396	250	-	-
Typhoon No 3 2010	5	-	-	-	-	47,828	2.4
Flood 2010	10 (3 children)	-	0	34,446	330	164,411	8.2
1/5/10	-	-	-	7,200	60	99,589	5.0
14-18/10	-	-	-	27,246	-	15	-
14-17/11					270	64,807	3.2
Flood 2011	13	6	-	67,787	-	830,600	41.5
25-26/9	-	-	-	6,500	-	78,000	3.9
15-18/10	-	-	-	10,141	-	31,000	1.6
4/8/11	-	-	-	51,146	-	721,600	36.1
Flood 2012	-	-	-		-	80	-

(*Source: Provincial CSFC, 2013*)

According to the annual report of the Provincial People Committee in Thua Thien Hue Province, the flood in 2010 (Figure 4.7) damaged more than 27,245 houses and 330 schools (TTHPPC 2010). Thousands of people have been affected leaving most of them homeless, with no food or water. There were 10 people reported dead or missing, among them 3 children (TTHPPC 2010). As reported by the Hue DoET, about 130,000 students could not go to school due to the flood. In more disadvantaged

areas, the pace of rehabilitating physical infrastructure to resume teaching and learning activities has been very slow, which negatively affected quality of education.

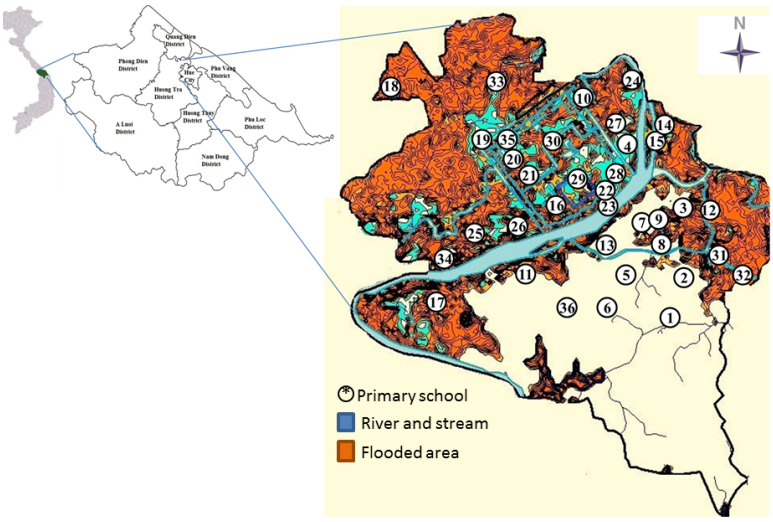


Figure 4.5 Location of primary schools overlaid on the inundation map of the 1999 flood in Hue City
(Source: developed from the inundation map of the 1999 flood in Hue City by TTHPPC in 2005)

Figure 4.6 Students backed home following teachers' direction in Flood 2010 in Quang Loi 2 Primary School, Quang Dien

Figure 4.7 Thuan Hoa Primary school in Flood 2011, Hue City

There are three floods occurred in 2011 (Figure 4.8) has submerged more than 67,787 houses and cost about 81.5 millions USD. Many schools reported more than a week interruption for each of floods, thus it was estimated that the floods in 2011

caused about one months of schooling interruption. This affected both educational quantity (i.e school time, number of school students, increase the drop out rate) and educational quality as many activities were cut down to keep school program to be completed as planned.

4.3.2 Education system in Thua Thien Hue Province

Thua Thien Hue Province has achieved most of the objectives for primary education set in the Educational Strategies 2001-2010. The provincial literature rate is 98.6 per cent (as of 2012). The province has made education compulsory at the level of primary school since 2002; completed the introduction of foreign languages to students, starting from Grade 3; improved the quality and efficiency of schooling, moving towards full-day schooling; increased the use of information technology in teaching and learning; reduced the student/teacher ratio and class size; and minimized the drop-out rate.

The number of schools increased from 226 schools in 2000 (Thua Thien Hue Province 2007) to 399 schools in 2012 (GSO 2013a). Currently, there are 393 schools, of which 229 are primary schools, 116 lower secondary schools, 36 upper secondary schools, 8 primary and lower secondary schools, and 4 lower and upper secondary schools (Table 4.4). Each ward or commune has at least a pre-school unit, a primary school, and a lower secondary school or combined primary and lower secondary school. In addition each district, or city has one or more upper secondary schools, and a continuing education center. The number of primary schools is higher in Hue City, Huong Tra and Phu Vang District compare to other districts.

The number of primary students steadily decreased with an annual rate of 1.4 per cent from 111,613 students in 2006 (GSO Hue 2011) to 93,912 students in 2013 (GSO 2013a). It is predicted that the number of primary school students will continue to decrease until 2020. Analysts believe that this phenomenon is due to the decreasing population growth rate (causing the declining number of 6-11 year-old population), the increase of educational quality (lower numbers of students repetition) and the achievement of correct-age enrollment (reducing number of late-entry or over-aged students in primary schools) (GSO Hue 2011). The changing numbers of school, classes, classrooms, teachers and students by districts in Thua Thien Hue Province from school year of 2005-2006 to school year of 2011-2012 is provided in the Appendix 4.

Table 4.4. Number of schools, classes, classrooms, teachers and students by districts in Thua Thien Hue Province (as of AY 2010-2011)

	Hue City	Huong Thuy	Huong Tra	Phu Vang	Phu Loc	Quang Dien	Phong Dien	Nam Dong	A Luoi	Total
Number of wards/communes	**27**	**12**	**16**	**20**	**18**	**11**	**16**	**11**	**21**	**152**
Number of schools	**74**	**31**	**48**	**60**	**49**	**37**	**46**	**18**	**29**	**393**
Primary	36	17	31	37	27	23	27	12	18	229
Lower secondary	26	11	13	18	14	11	15	4	6	116
Upper secondary	10	3	3	4	5	3	4	2	2	36
Primary and lower secondary	1		-	-	3	-	-	-	2	8
Lower and upper secondary	1		1	1	-	-	-	-	1	4
Number of classes	**1655**	**586**	**718**	**1162**	**967**	**542**	**707**	**186**	**354**	**6886**
Primary	725	301	370	645	519	273	345	102	220	3,500
Lower secondary	589	201	246	375	318	187	249	54	92	2,320
Upper secondary	341	84	102	142	130	82	113	30	42	1,066
Number of classrooms	**1258**	**508**	**586**	**877**	**750**	**391**	**545**	**181**	**292**	**5388**
Primary	679	320	373	522	458	230	323	116	198	3,219
Lower secondary	332	130	151	217	208	120	153	49	64	1,424
Upper secondary	247	58	62	138	84	41	69	16	30	745
Number of teachers	**2721**	**1285**	**1037**	**2121**	**1597**	**943**	**1306**	**323**	**781**	**12114**
Primary	1,012	513	421	912	682	369	540	142	373	4,964
Lower secondary	1,024	502	413	827	640	392	526	117	244	4,685
Upper secondary	685	270	203	382	275	182	240	64	164	2,465
Number of students	**63877**	**23091**	**17444**	**36547**	**30595**	**17722**	**20859**	**5086**	**8949**	**224170**
Primary	25,564	10,515	7,884	17,418	13,784	8,066	8,447	2,252	4,654	98,584
Lower secondary	22,349	8,256	6,420	12,905	11,546	6,434	7,931	1,603	2,564	80,008
Upper secondary	15,964	4,320	3,140	6,224	5,265	3,222	4,481	1,231	1,731	45,578

(*Source: DoET of Thua Thien Hue Province, 2010*)

There is a drop in school size and class size due to the decreased number of students and increased number of teachers. The rate of classrooms/schools has decreased from 15.09 in 2006 to 13.71 in 2010. The rate of classes/classrooms on average in the period 2006-2010 is 0.64, which remains one of the main barriers for the full-day schooling targets. The student/teacher ratio has reduced from 25.12 in 2006 to 17.87 in 2012 (GSO 2013a). As such, the number of teachers is satisfactory, yet the number of classes, or infrastructure and equipment is inadequate for full-day schooling.

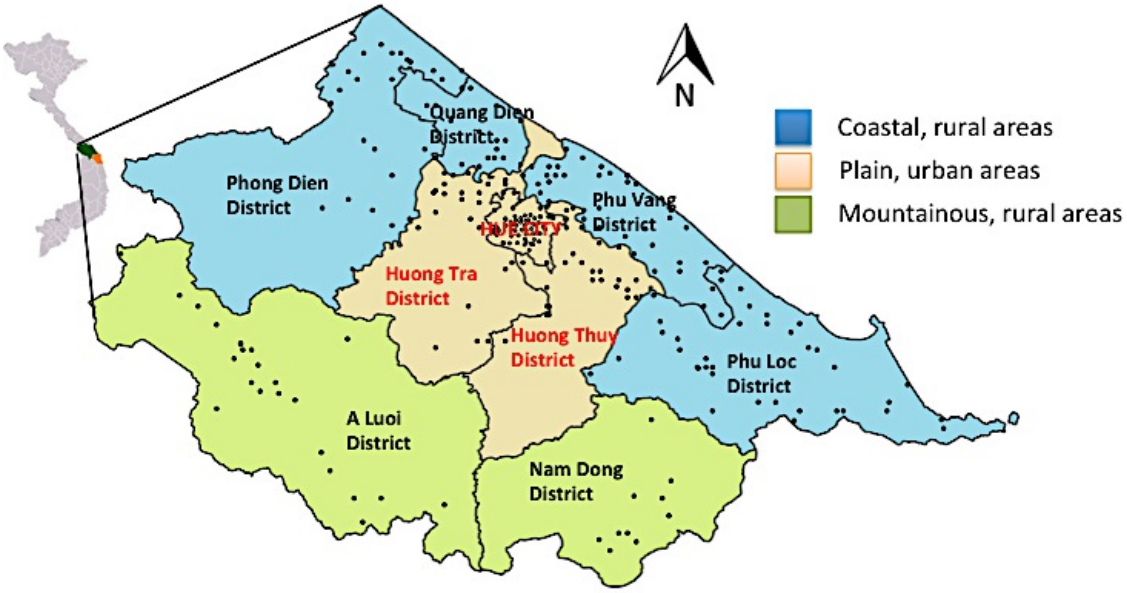


Figure 4.8 Map of primary schools in Thua Thien Hue Province

Thuong Quang primary school, Nam Dong District

Binh Thanh primary school, Huong Tra District

Thi Tran 1 primary school, A Luoi District

Typhoon mitigation by using sand bag to secure the roof

Quang Ngan primary school, Quang Dien Phu Da primary school, Phu Vang

Figure 4.9 Some photos of primary schools in different geographical regions in Thua Thien Hue Province

4.3.3 Overall SDRA results

To understand the current level of educational resilience to disaster, the SDRA was applied through a questionnaire survey for all primary schools in Thua Thien Hue Province. Of the 229 questionnaires distributed, 218 questionnaires were fully completed and returned (95.2 per cent of total sample). The full analysis results of 9 districts and all 218 primary schools are given in Appendix 5 and 6, respectively.

The results of the analysis are presented in two ways, first by graphs of average resilience scores of all primary schools and second by maps of resilience scores grouped by districts and wards in Hue Province. The graphs point out which factors should be focused on to enhance resilience of primary school and of the primary education system as a whole, while the spatial analysis shows the different levels of resilience among various regions. In order to make the variation between resilience score more visible, the score is categorized into five levels from very high ($4.2<x\leq5.0$), high ($3.5<x\leq4.2$), medium ($2.7<x\leq3.5$), low ($1.9<x\leq2.7$), very low ($1.1\leq x\leq1.9$) (x is weighted score). The score of each district or ward is averaged by score of schools within its area.

4.3.3.1 Overall resilience

Figure 4.11 shows the average score of all primary educational resilience in five dimensions. The disaster resilience score of primary schools in Hue Province varies from 2.16 to 4.29 (higher score mean higher resilience and vice versa). Among 218 schools, only one school is categorized as very high, 16 per cent is high, more than 70

per cent is medium and 13.3 per cent is low, no very low scale is recorded. In the following part, the parameters are examined to explain the factors that contributed to the results.

4.3.3.2 Physical condition

The average score of physical conditions is comparatively high among the five dimensions. Of which scores of school buildings and hygienic conditions parameter are high while that of the facilities and equipment parameter are low. According to the Hue DoET, the school infrastructure in Hue Province has been upgraded and improved recently. About 10 schools were newly built after historical flood in 1999. In addition, the number of schools that meet the national standards is increasing, up to more than 30 per cent in 2010. Currently, about 25 per cent of schools in Hue have three stories, 47 per cent of schools have two 2 stories, and 28 per cent of schools has one story. Every year, checking of school buildings especially of educational facilities and equipment is compulsory for all schools and is carried out at the beginning of the school year. In some cases, schools will be requested by the DoET to carry out investigation for school buildings before the flood season to ensure safety and minimize economic losses. However, facilities and equipment for primary schools are insufficient in quantity, in the first place. After a disaster, there are not more than 25 per cent of damaged facilities and equipment can be repaired or renovated. This causes education to be interrupted in most primary schools in Hue Province.

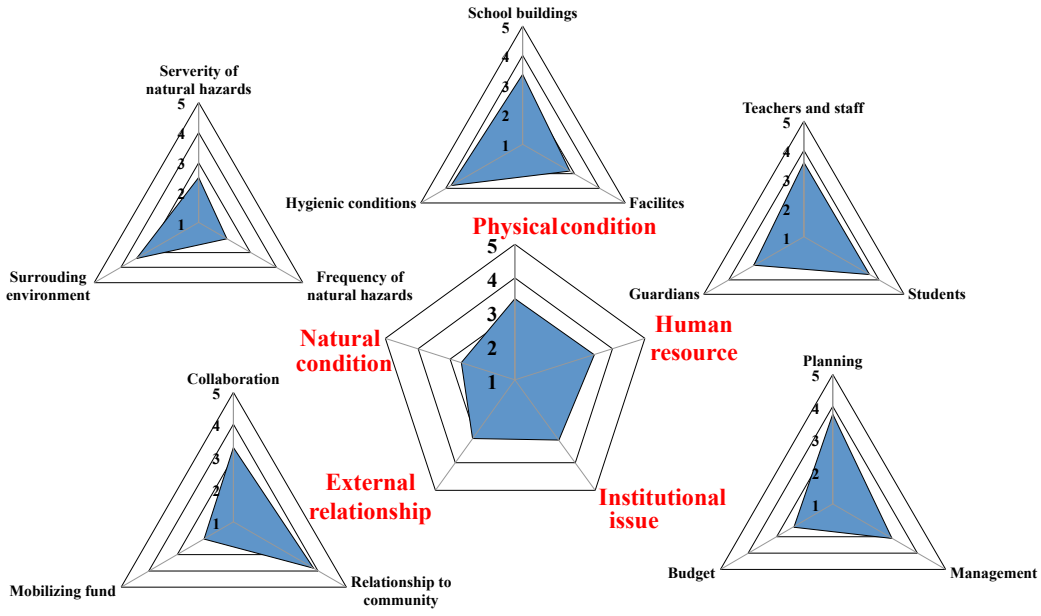


Figure 4.10 Overall disaster resilience score of all primary schools in Thua Thien Hue Province

4.3.3.3 Human resource

The average resilience score of human resource is the highest among the five dimensions. This is due to the improved education quality as indicated by the high passing rate of students and low dropout rate of students. The rate of students that pass primary education to proceed to lower secondary education reaches 100 per cent in most schools in the school year 2009–2010. In addition, the ratio of teacher/students is relative high, around 1:21 and teachers/class is around 1.62. According to the MoET (2011), the percentage of qualified teachers in Central Vietnam is very high, at 92 per cent, just lower than the highest rate of 95 per cent in the Red river delta. This high human resource score provides a good opportunity for integrating disaster risk reduction into the curriculum of primary education. Among three factors that contribute to human resource resilience, guardians have the least contribution with the score of 2.92. This is partially a result of a lack of training program that is designed for guardians and the low involvement of guardians in disaster activities of schools.

With regard to the number of teachers, staff, and students that meet the basic disaster training standard, it is found that 55 per cent of schools have more than 75 per cent of teachers, staff, and students who are equipped with proper knowledge and awareness on risks and impacts of disasters. In 2001, the Vietnam Red Cross Society (VNRC) has implemented a program called ‘‘Introducing Disaster Preparedness in Primary Schools’’ aimed at reducing disaster risk for school-going children. Following this program, 100 per cent of teachers and students of grade 4 and 5 in primary schools of all 21 of the most disaster-prone provinces in Vietnam including Thua Thien Hue Province were trained on disaster preparedness. However, this program’s activities have not been replicated due to budget constraints. Finally, a strong connection between school and family is reflected in the average high score of school-home notification in emergency situations. Accordingly, most schools rank this issue as important, nearly 4 in the scale from 1 to 5.

4.3.3.4 Institutional issue

The institutional dimension mainly focuses on the internal management of each school rather than the general policy framework of sub-DoET. Although all primary schools in Hue Province are under the management of sub-DoET, each school is responsible to develop their own school planning, regulation, syllabus as well as

budget allocation pursuant to the directions of the DoET. The schools, which have high human resilience scores, tend to have high level of institutional scores. This is because of the high number of trained teachers as well as high awareness of School Management Board on the importance of disaster preparedness and recovery plan in minimizing losses from disasters. The average institutional score is quite high among the five dimensions. This is because 100 per cent of primary schools have their own Board of Flood and Storm Control led by the school principal. This Board is responsible for developing a flood and storm control plan at the beginning of the school year. In this plan, the roles of all stakeholders are clearly defined. This plan is then shared among teachers and staff, students, and guardians. Many schools incorporate disaster components into their general regulation. In most cases, it is just to make arrangement for educational facilities prior to a disaster.

The score of the budget parameter is lowest among the three parameters of institutional issues. For primary schools, the school fee is free and the annual finance budget is provided by the DoET depending on the size of school and the number of teachers, students, and classes. The School Management Board will then decide how many percentage of the budget can be allocated to disaster management. However, because more than 70 per cent of budget is allocated for salary of teachers and staff, most primary schools find it very difficult to spend more on disaster activities.

4.3.3.5 External relationship

The external relationship's score varies largely among different wards because there is no consistent norm or regulation on the collaboration between schools and local government, communities, and other organizations. Also, within one ward or commune, there is a mixed pattern of very high resilience and very low resilience. Take An Cuu ward for example, whose external relationship's score is composed of a very high score of An Cuu school (4.50) and very low score of Ngu Binh school (2.53).

The external relationship's score result also illustrates a shortage of budget for disaster activities. It is found that there is a limitation in mobilizing fund from external sources such as local government, communities, and other organizations. After a disaster, the sub-DoET tries to find donors to support schools based on the damage level reported from schools. The sub-DoET itself does not have fund for recovery of schools after a disaster. Only in cases where school building collapse or

equipment and facilities are heavily damaged will the school receive funding and support from the provincial DoET, Red Cross, and local government. It is the responsibility of schools themselves to mobilize fund from the Parents Association, communities, and other organizations. However, mobilizing fund from Parents association, communities, and other organizations is often limited because 80 per cent of the people in Hue Province belong to the medium income bracket, all suffering from the burden of daily expenditures. Furthermore, the number of poor households is around 4.8 and 7.5 per cent of households have monthly income below 17 USD.

4.3.3.6 Natural condition

The natural dimension is recorded lowest among the five dimensions due to the low score in both severity and frequency of natural hazards. As mentioned earlier, Hue Province is considered to be among the most vulnerable to disasters in Vietnam, particularly to floods and storms. With a high river network density of 0.6 km/km^2, more than 80 per cent of primary schools in Hue Province are located within 2 km^2 from rivers. It is notable that the score of surrounding environment of schools is high since most schools are located within 5 km of the local people committee office, police station, or health center.

4.3.4 Results based on locations of schools

The variation of schools in different areas is considered as schools located in the urban or rural areas, in coastal, plain or mountainous areas are exposed unequally to natural hazards and associated risks. In this study, there are 75 urban schools located in urban plain land and 143 rural schools (117 located in coastal areas and 26 located in mountainous areas). Of 75 urban schools, there is one schools have very high resilience score, 20 per cent is categorized as high, more than 70 per cent is at medium level and only about 6 has low scores. From this, it can be assumed that the educational resilience, on average, is higher in urban areas than in rural areas (Figure 4.12).

In order to figure out the factors that have important impacts to the disaster resilience score, correlation analysis was done between the five dimensions and the overall resilience score. Correlation is a term that refers to the strength of a relationship between two variables, specifically between the dimensions and overall resilience value. A strong, or high, correlation means that two variables have a strong relationship with each other while a weak, or low, correlation means that the variables

are hardly related. Correlation coefficients can range from -1.00 to +1.00, whereby the value of -1.00 represents a perfect negative correlation and a value of +1.00 represents a perfect positive correlation. A value of 0.00 means that there is no relationship between the investigated variables. The most widely used type of correlation coefficient is the Pearson r, which is also referred to as linear or product-moment correlation.. The coefficient is calculated by taking the covariance of the two variables and dividing it by the product of their standard deviations as in the equation below (Figure 4.12).

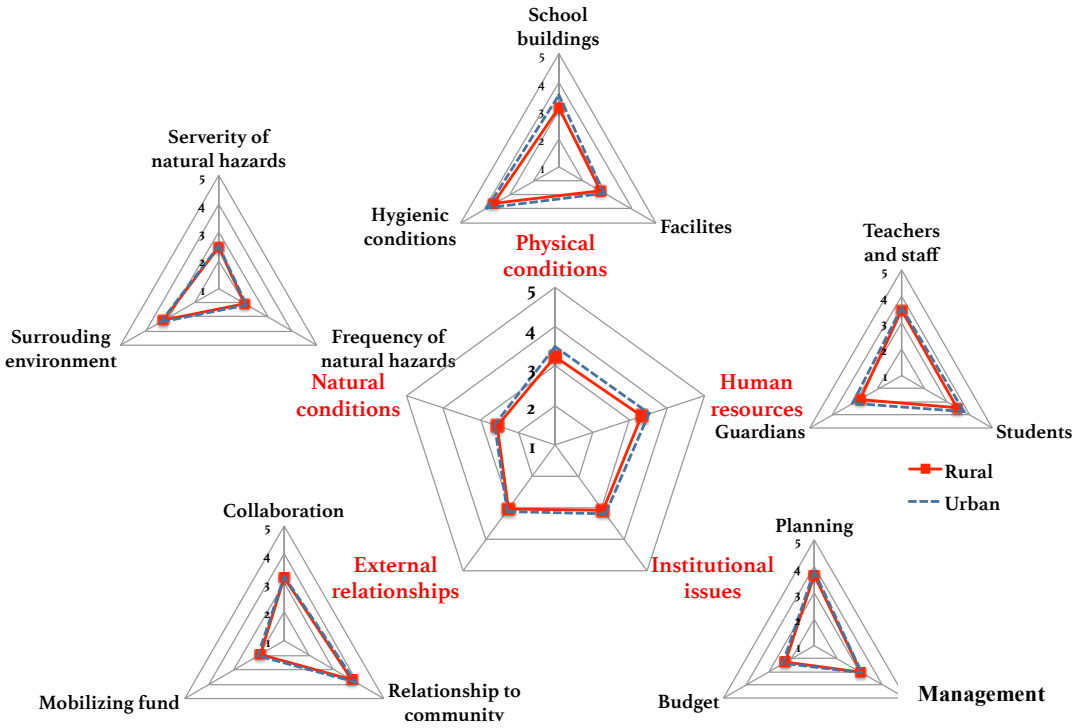


Figure 4.11 Comparison between the educational resilience of primary schools in urban and rural areas in Thua Thien Hue Province

$$r = \frac{\sum XY - \frac{\sum X \sum Y}{N}}{\sqrt{\left(\sum X^2 - \frac{(\sum X)^2}{N}\right)\left(\sum Y^2 - \frac{(\sum Y)^2}{N}\right)}}$$

Figure 4.12 Pearson correlation coefficient formulation

It is interesting to note here that the correlations between the *Human resource* and *Institutional issue* dimensions with the overall resilience were high in all regions, especially in rural schools. The positive correlation implies that enhancing *Human resource* and *Institutional issue* has the most potential to bring up the whole resilience

level of primary education system. In particular for rural schools in mountainous areas, aside from *Human resource* and *Institutional issue, Physical condition* dimension also shows strong correlation, while natural conditions are inverse proportion with the overall resilience (Table 4.5).

Table 4.5 Correlation coefficient between dimensions and overall resilience

	Physical condition & Overall resilence	Human resource & Overall resilence	Institutional issue & Overall resilence	External relationship & Overall resilence	Natural condition & Overall resilence	SDRA
Urban, plain	0.68	0.72	0.77	0.65	0.34	3.18
Rural, coastal	0.69	0.75	0.73	0.68	0.28	3.05
Rural, mountainous	0.75	0.8	0.75	0.72	-0.19	3.04

The following part will explain the resilience at district levels to see the variation of resilience level of schools located in different regions and even within one region. As can be seen from Table 4.6 that urban plain area has the highest resilience score followed by rural coastal and mountainous areas, respectively.

The physical conditions vary largely among regions and districts (Figure 4.13b). While rural mountainous area has the lowest resilience score among the three regions, Nam Dong district achieved the highest score in physical conditions and also high score in the overall resilience. However, located in the same region, A Luoi district has the lowest score in physical conditions and also the second lowest score of overall resilience, slightly above Phu Vang district. In particular, schools in Nam Dong district has highlighted the importance of regular check on school buildings, on facilities and equipment, and on the facilities and equipment, and on the arrangement of hazardous materials. According to the staff in BoET of Nam Dong District, schools under the direction of local government and in cooperation carry out infrastructural and non-infrastructural regular checks in schools annually with local community.

Human resource' disparity between the three areas is insignificant, only small variation is observed in the parameter of the Parents parameters (Figure 4.13c). Additionally, due to time constraints, it is more difficult for urban schools to strengthen the role of teachers and staff on disaster activities despite the fact that urban schools have a larger number of qualified teachers and staff. On average, rural teachers perform about as well as urban teachers regarding disaster related issues, with only a small variation observed. Another issue found from the study is the lack

of student training on disaster risk reduction in rural coastal and mountainous areas. According to most of the rural school' principals, general training course or even specialized course offerings in rural schools are more limited because of the shortage of qualified teachers and due to financial constraints. Training activities for rural students are thus necessary to focus on skill development in reducing risks to address both existing problems and additional problems posed by disasters. Moreover, researches suggests that rural schools have at least two advantages over urban schools: strong relationships among school members, and a narrower curriculum, which in turn provide more time for extra-curricular activities activities, including disaster activities (Lindsay 1982, William and Herbert 1991, Lee and Loeb 1996).

Table 4.6 SDRA values by districts in Thua Thien Hue Province

	TP HUE	Huong tra	Huong Thuy	Phu Vang	Quang Dien	Phu Loc	Phong Dien	A Luoi	Nam Dong
Number of schools	36	24	15	37	23	30	27	20	6
P1	3.78	3.40	3.22	2.91	3.10	3.31	3.22	2.98	3.57
P2	3.08	2.82	2.45	2.75	2.78	2.57	3.05	2.30	3.34
P3	4.19	3.81	3.48	3.39	3.38	3.88	3.84	3.58	4.27
Physical condition	3.69	3.38	3.14	3.16	3.11	3.32	3.47	3.01	3.69
H1	3.50	3.71	3.43	3.47	3.58	3.66	3.29	3.34	3.44
H2	3.61	3.98	3.72	3.37	3.38	3.57	3.61	3.39	3.48
H3	3.19	3.01	3.14	2.66	2.67	2.87	2.98	2.83	3.30
Human resource	3.47	3.57	3.52	3.31	3.25	3.43	3.31	3.17	3.44
I1	3.87	3.95	3.52	3.56	3.66	3.76	3.82	3.60	3.41
I2	3.11	3.08	3.00	3.00	3.03	3.06	3.22	2.88	2.92
I3	2.57	2.31	2.15	2.07	2.88	2.19	2.11	2.19	2.73
Institutional issue	3.26	3.23	2.95	2.98	3.26	3.05	3.15	2.97	3.14
E1	3.28	3.09	3.36	3.19	3.42	3.18	3.41	2.64	3.61
E2	3.88	3.89	3.77	3.47	3.63	3.88	3.89	3.72	3.80
E3	2.24	1.94	1.87	1.68	2.26	1.79	2.20	1.96	2.31
External relationship	3.26	2.90	3.09	2.87	3.29	3.04	3.18	2.76	3.27
N1	2.49	2.46	2.56	2.31	2.35	2.02	2.66	3.20	2.42
N2	2.25	2.00	2.13	1.87	1.96	1.77	2.45	2.44	1.91
N3	3.33	3.29	3.54	3.31	3.59	3.10	3.23	3.12	3.32
Natural condition	2.60	2.58	2.75	2.46	2.45	2.29	2.79	2.95	2.79
SDRA	**3.26**	**3.13**	**3.09**	**2.95**	**3.11**	**3.03**	**3.18**	**2.97**	**3.26**
	Urban plain			**Rural coastal**				**Rural mountainous**	
	3.18			**3.16**				**3.07**	

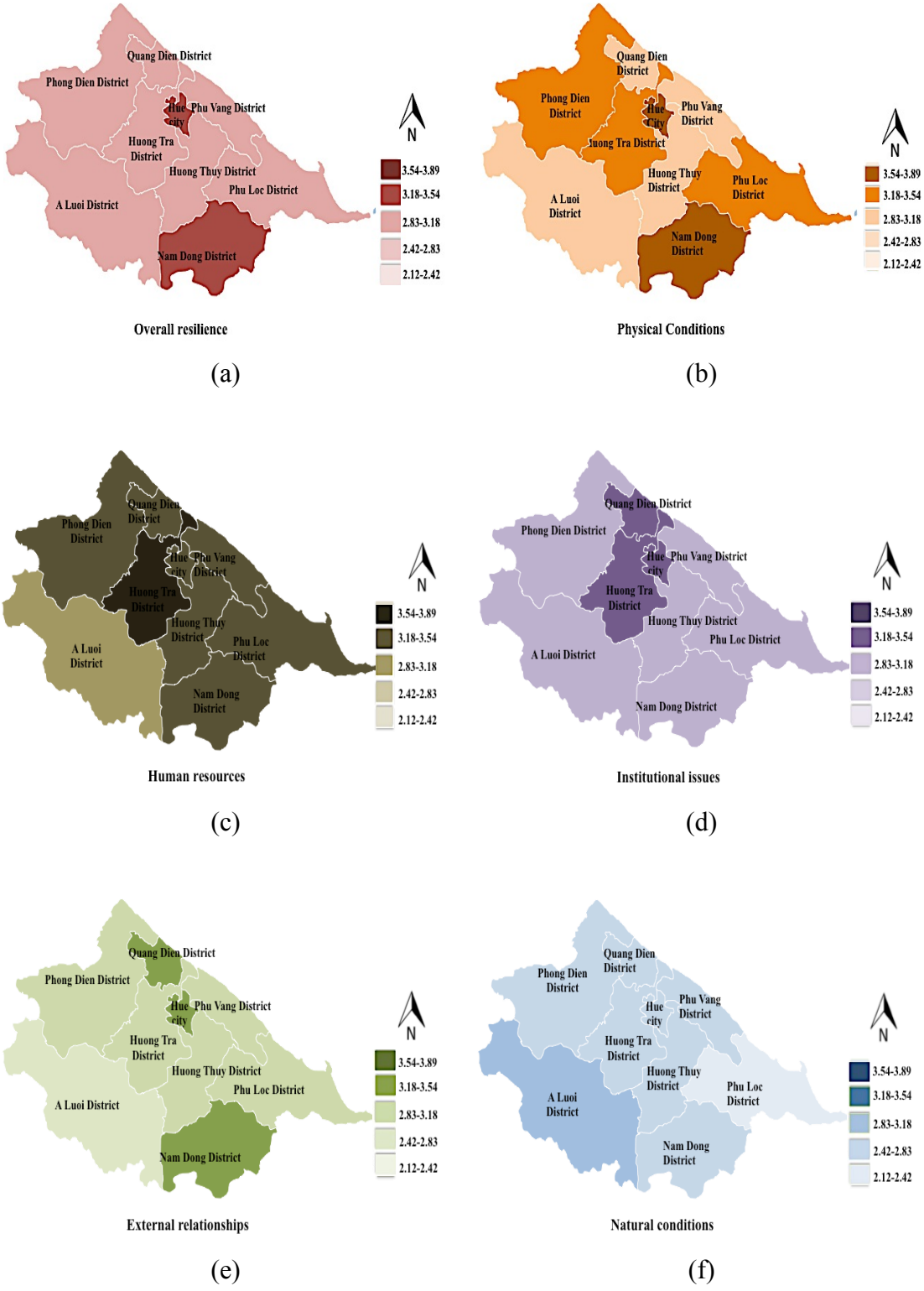


Figure 4.13 The spatial map of resilience score in nine districts in Thua Thien Hue Province

This corresponds with the higher score in Students parameter of rural schools compare to urban schools. The Parents parameter follows a different pattern from the teachers and students parameters demonstrating higher involvement of Parents in rural schools compared to urban schools. A significant number of research has shown the importance of involving Parents in rural school such as improvement efforts, particularly in support of student academic achievement (Wettersten *et al.* 2005, Barley and Beesley 2007, Batt 2008, Harmon and Schafft 2009).

The institutional issues show a little variation among regions, however, the largest discrepancy is evidenced in the allocation budget for disaster risk reduction activities in schools (Figure 4.13d). For primary schools, the school fee is free and annual budget is provided by the DoET depending on the size of school and the number of teachers, students and classes. According to Decision No. 151/2006/QĐ-TTg of the Prime Minister on the regulation for educational budget expenditure, about two thirds of the total budget is allocated for salary and allowances and one third is assigned to all other types of activities in one financial year. In direct proportion to their bigger size, urban schools received larger amount of annual budget. However, due to the higher competition of other irregular activities, the budget allocated specially for disaster activities such as disaster training, preparedness, response, and recovery are lower in urban areas. Apart from this, dissemination of disaster information is strongly improved with the variety of educational materials developed by NGOs and other organizations in urban areas. This provides urban schools with the tools for the promotion of disaster risk reduction education. In contrast, it is reported that inadequate provision of disaster related information hindered an early warning delivery and limited disaster activities held in rural schools. This highlights the need for empirical steps to develop practical skills and enable actual actions to response to disaster in rural areas.

The external relationships also follow the same pattern with the human resources and institutional issues with the higher score in urban areas compare to rural areas (Figure 4.13e). However, it is worth to note that the highest external relationship belong to Quang Dien and Nam Dong districts located in rural coastal and mountainous areas, respectively. With regard to the role of school in urban and rural communities, many studies prove that urban schools tend to be viewed as vehicles for bringing about societal change while rural schools are seen as mechanisms for

community cohesion and continuity (Boyd and Immegart 1977, McCracken and Barcinas 1991). In the same way, results find that 100 per cent of schools in rural areas are considered as evacuation shelters for the whole community during emergency, while only a small number of urban schools function as evacuation centers. Additionally, most of the schools in rural areas play important role in the development of disaster management plans through their participation in disaster activities held by the local community. In contrast to the strong connection between rural school and local community, school leaders in urban areas demonstrate little concern in collaborating with the local community in development efforts.

Regarding the natural dimension, results show the low score in all regions (Figure 4.13f). In particular, the lowest score among three regions is coastal areas, which is strongly impacted by typhoons.

4.3.5 Change in school disaster resilience in Hue City after two years

In order to understand the change of school resilience level under the influence of the socio-economic development, the study carried out the second survey of SDRA for all 36 primary schools in Hue City in February 2013 (two years from the first survey in February 2011). SDRA analysis of all 36 schools in 2013 is presented in the Appendix 7.

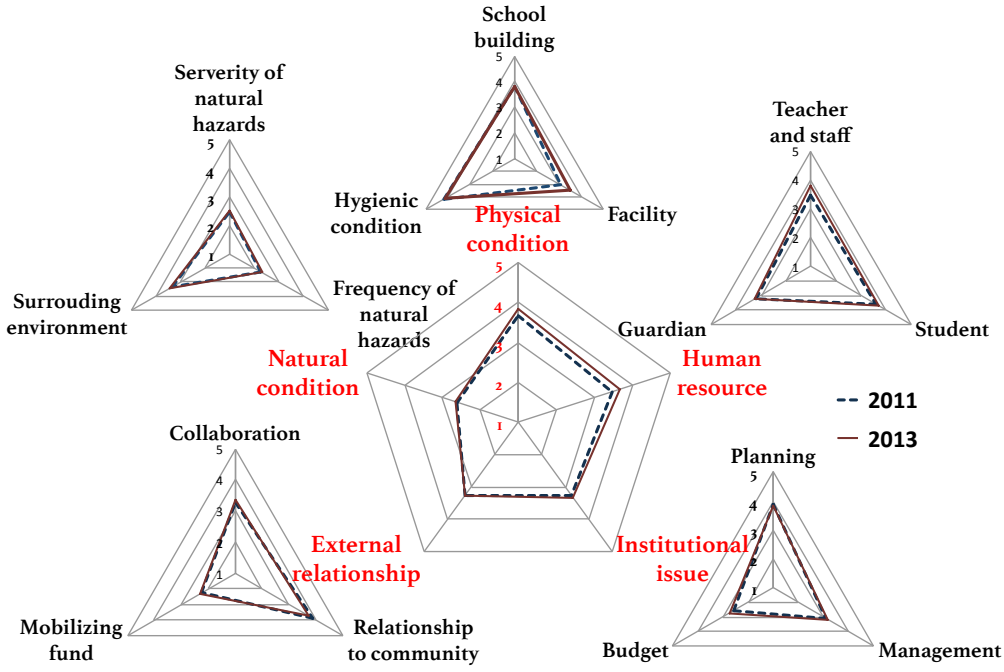


Figure 4.14 Comparison between resilience of primary schools in Hue City in 2011 and 2013

Results revealed several findings regard to the alterations of five dimensions and its associated parameters and variables (Figure 4.14). There is an upward trend recorded for all the five dimensions with the overall resilience slightly increase from 3.26 in 2011 to 3.36 in 2013 (Table 4.7). The notable change among five dimensions is Human resource with a rise of 5.8 per cent during the period of two years. Among the three factors contribute to *Human resource* parameter, teachers' awareness and capacity on DRRE achieved the most significant increase. Meanwhile, students' knowledge and awareness on disaster risk reduction are inadequate and need improvement.

Table 4.7 Change of the resilience level of primary schools in Hue City (2011-2013)

		Physical condition	Human resource	Institutional issue	External relationship	Natural condition	Overall
Score	2011	3.69	3.47	3.26	3.26	2.60	3.26
	2013	3.85	3.67	3.34	3.28	2.66	3.36
Increase from 2011 to 2013		4.3%	5.8%	2.5%	0.6%	2.3%	

The second achievement is in physical conditions, especially the advancement of school facilities and equipment, which increased by 14 per cent from 2011 to 2013. One of the reasons is due to the implementation of "School concrete" project, which targeted to strengthen or rebuild schools in the safer place. As a result, damages caused by natural disasters to school buildings and facilities reduced considerably. Besides, the better supply of emergencies bag and storage of food, water for disasters has also contributed to the increase of physical resilience in schools. This finding correlates with results of the second assessment using Climate Disaster Resilience Index (CDRI) for Hue City in 2013, which proved that there is an improvement of housing and land use planning by 20 per cent from 2010 to 2013 in the city (Shaw *et al.* 2013) (Table 4.8).

Table 4.8 CDRI value of Hue City in 2011 and 2013

	Physical condition	Human resource	Institutional issue	External relationship	Natural condition	Overall
2011	4.35	4.18	3.04	4.31	3.45	3.87
2013	4.44	4.01	3.60	3.90	2.81	3.75

Institutional issue has increased slightly from 3.26 in 2011 to 3.34 in 2013, with a significant contribution of budget allocation for disaster risk reduction in schools. The amount of budget for disaster risk reduction related activities such as preparedness, response, recovery and repairing/renewing after disasters, as well as for supporting students in difficulties has been improved while the budget allocated for disaster risk reduction training has been go down despite the fact that it was ranked as one of the most important tasks for DRRE from 2011. In contrast, the incorporation of disaster risk reduction issues into the school planning and regulation has been remained as challenges for schools. Thus more work need to be done to promote the comprehensive integration of disaster risk reduction into school planning, and regulation, as well as the teaching and learning activities in schools.

While other dimensions have tendency to grow up during the last two years, the external relationships remain almost the same with little increase of 0.6 per cent. Particularly, the relationship between school and community has evidenced a downward, which is a result of limited participation of schools in disaster planning and activities held by local community, as well as reduced support from local community to schools. One of the reasons is due to the change of many schools' locations and rebuilt of school in new places, which improved the physical conditions of schools, yet simultaneously break down the relationship between schools and communities. Example can be seen in case of Phu Luu primary school whose physical conditions increased by 38 per cent, yet the Relationship with community has been decreased by 44 per cent. In essence, it takes only a short of time for schools to be moved to another place or rebuilt in a new location, yet it may takes many times more than that to establish a relationship between school the local environment. Therefore, it is important for policy-makers to consider the measures to rebuild the culture and the cooperation at the same time with planning for school locations. Furthermore, while there is an increasing in financial support from the local government specific on disaster risk reduction activities in schools, that from Parents Association and other organization has been reduced slightly. Study from Shaw et al. (2013) also confirmed the reduction of social issues (Table 4.9), especially social capital by 20 per cent from 2010 to 2013. It is suggested that the city should encourage more participation from the citizens in communities' activities as well as in the city's decision-making process (Shaw *et al.* 2013).

Natural dimension recorded a better conditions in 2013 compared to 2011 both in frequency and severity of natural disasters. As reported by the Provincial CFSC (2013), the total damages caused by natural disasters in the year of 2011 and 2012 were insignificant compare to damages caused by disasters in 2010 and before. However, it is noted that flood occurs more frequently with less severe while number of typhoons has been reduced yet the intensity increase considerably during the last three years. Notably, the enhancement of school location in safe areas contributes the most for the improvement of natural conditions.

Table 4.9 Comparison between CDRI assessment and SDRA assessment in Hue City (wherever relevant and as of 2013)

CDRI (city level)	2010-2013	SDRA (school level)	2011-2013
Dimensions			
Physical dimension	↑	Physical dimension	↑
Social dimension	↓	External relationship	↑
Institutional dimension	↓	Institutional issue	↑
Natural dimension	↓	Natural condition	↑
Parameters			
Housing and land use planning	↑	Location of school	↑
Social capital	↓	Relationship to community	↓
Budget subsidy for DRR	↑	Budget allocated for DRR activities in schools	↑
Management issues	↓	Management issues	↓
Collaboration	↓	Collaboration	↑

According to the Educational development planning of the Province until 2020, schools located in hazardous and unsafe areas will be moved or rebuilt in the safer land. For examples, Huong So, Phu Thuan and Phu Luu primary schools have been moved to new places. As a result, these schools have experienced an increase of surrounding environmental parameters, from 3.60 to 3.67, 3.20 to 3.47, and 2.20 to 2.67, respectively.

Parameters and variables wise

Look at the alteration of each parameter, aside from the considerable rise of teachers, other issues related to Physical condition and Institutional issue such as facilities and equipment in schools, budget allocated for disaster risk reduction activities in schools and locations of schools have been significantly improved (Figure 4.14). Positive score means that there is an increasing of resilience value of 2013 compare to that of 2011.

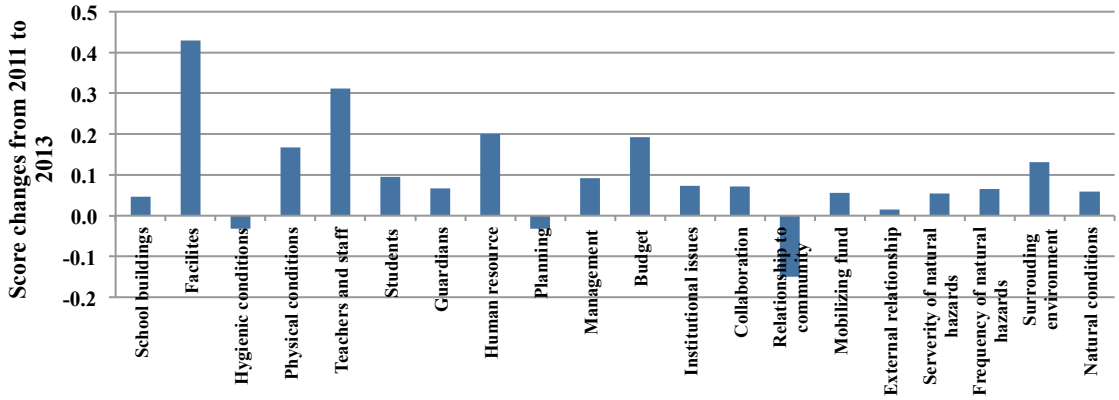


Figure 4.15 The change of dimensions and parameters' scores from 2011 to 2013

There are five among the top ten variables remain as high score after the two year, which related to Human resource and Physical condition such as sharing school emergency procedure and preparedness plan for teachers, staff and student, availability of school-home emergency notification system., percentage of garbage collection daily, and food safety in schools (Table 4.10).

Table 4.10 The top ten variables scored by the schools

Variables (as of 2011)		WS[1]	Variables (as of 2013)		WS
2.1.5	Sharing of school emergency procedure and disaster preparedness plan to teachers and staff	1.14	2.1.5	Sharing of school emergency procedure and disaster preparedness plan to teachers and staff	1.13
1.3.1	Availability and frequency of environmental protection campaigns held in school	1.06	1.2.3	Availability of the emergency supplies (ex. emergency bag, storage food and water, flashlight,…)	1.02
4.1.4	Availability of early warning system from local government	1.00	3.2.2	Dissemination of disaster related information (books, disaster newsletter, etc.)	1.01
2.2.5	Sharing of the school emergency procedure and disaster preparedness plan to students	1.00	1.3.3	Food safety conditions of school to ensure the health for students	1.00
1.1.2	Application of safety standards/building codes set by the government for school buildings	0.99	1.3.4	per cent of garbage collected and dumped in proper place per day	0.99
1.3.4	per cent of garbage collected and dumped in proper place per day	0.99	4.1.5	Effectiveness of collaboration with local government during a disaster	0.99
3.1.4	Availability of school's disaster preparedness and emergency management plan with defined role of staff, teachers, students and Parents	0.97	2.3.3	Availability of school-home emergency notification system	0.98
1.3.3	Food safety conditions of school to ensure the health for students	0.97	3.2.1	Availability of school early warning system (disaster calendar, public address, emergency contact list..)	0.96
4.2.3	How often does the school participated in disaster related programs/activities held in communities (disaster drill, town watching, cleaning after disaster, etc.)	0.96	2.2.5	Sharing of the school emergency procedure and disaster preparedness plan to students	0.96
2.3.3	Availability of school-home emergency notification system	0.96	1.3.2	Availability and frequency of regular check on hazardous materials to ensure safety against disasters	0.95

[1] WS: weighted score

Table 4.11 shows the lowest variables scored by the primary schools in Hue City. There are seven out of ten variables remain as the lowest scores despite the improvement of socio-economic conditions during two years from 2011 to 2013. As such, what the schools need to focus on to improve the situation includes the implementation of teaching and learning activities, development the mechanism to encourage more involvement of Parents' participation such as frequency meeting of Parents-Teacher Association, provide training and awareness raising for Parents. Besides, enhancement of budget allocation for disaster outreach activities from school to community and for supporting to students with special needs is also important. The number of schools located near river and coastal areas is till high, thus more work is needed for planning and improving school location.

Table 4.11 The ten lowest variables scored by the primary schools in Hue City

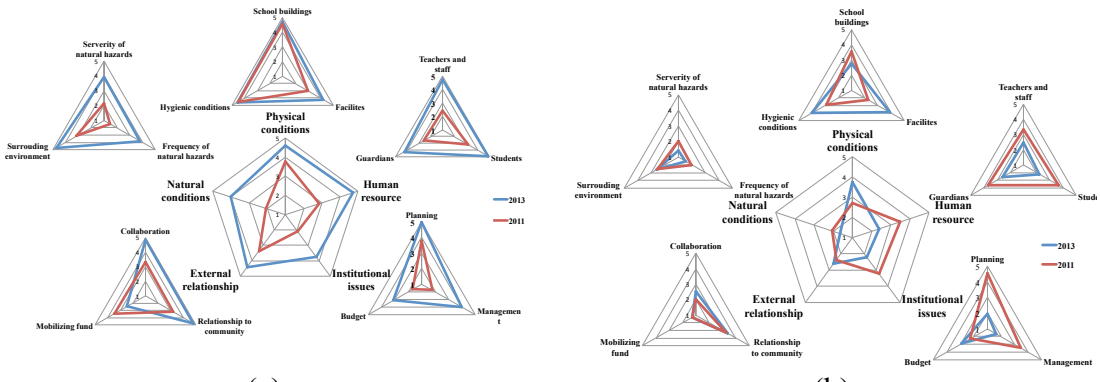
Variables (as of 2011)		WS	Variables (as of 2013)		WS
5.2.3	Frequency of heat waves	0.36	3.2.3	Implementation of disaster activities (town watching, disaster drill, writing/drawing competition, etc.)	0.41
3.3.2	Percentage of school budget allocated for disaster outreach school activities to build partnerships in 2010	0.35	3.2.4	Availability and frequency of regular meeting of disaster group with the participation of staff, teachers, students and Parents	0.40
3.2.3	Implementation of disaster activities (town watching, disaster drill, writing/drawing competition, etc.)	0.32	3.3.5	Percentage of school budget allocated for supporting students that have special needs in 2010	0.40
2.3.1	Regular meetings of the Parents-Teacher Association (PTA) that specifically discuss on disaster related contents	0.31	4.3.1	Fund support from the Government specific on disaster activities in 2010	0.39
4.3.4	Ability to mobilize funds from other organizations, NGOs, private organizations, after 2010 disaster	0.31	5.3.2	Distance to nearest river/stream/sea	0.38
4.3.3	Ability to mobilize funds from local community after 2010 disaster	0.31	3.3.2	Percentage of school budget allocated for disaster outreach school activities to build partnerships in 2010	0.36
2.1.1	Percentage of teachers and staff affected by disaster in 2010	0.30	5.2.1	Frequency of floods	0.36
2.3.2	Frequency of regular training for Parents about risk and impacts of disasters	0.29	4.3.3	Ability to mobilize funds from local community after 2010 disaster	0.33
3.3.5	Percentage of school budget allocated for supporting students that have special needs in 2010	0.28	1.3.5	Availability of reuse/recycle system for school garbage (used papers, pens, etc.)	0.31
1.3.5	Availability of reuse/recycle system for school garbage (used papers, pens, etc.)	0.26	2.3.1	Regular meetings of the Parents-Teacher Association (PTA) that specifically discuss on disaster related contents	0.26
5.3.2	Distance to nearest river/stream/sea	0.25	2.3.2	Frequency of regular training for Parents about risk and impacts of disasters	0.25
1.2.2	Percentage of facilities and equipment affected by disaster in 2010	0.22	4.3.4	Ability to mobilize funds from other organizations, NGOs, private organizations, after 2010 disaster	0.24

The important level of variables or task of DRRE ranked by schools has not changed significantly (Table 4.12). For example, five out of the top ten variables remains as the most importance, similarly, seven out of ten variables remains as the less importance from 2011 to 2013. Location of schools and sharing the disaster

emergency procedure and preparedness plan between students, teachers and staff are highlighted important among others. Clear correlation between the improvement of the Human resource, particularly of Teachers parameter, and the enhanced overall resilience can be seen clearly from the change in resilience score of the lowest (Phu Hoa primary school) and the highest school (So 2 An Dong primary school) from 2011 to 2013 (Figure 4.14). For the case of Phu Hoa primary school, there is an extremely increase of all parameters and variables, particular the improvement of the Teacher from 2.40 to 4.73 in 2013 (by 97 per cent), and of the Human resource from 2.60 to 4.72. Meanwhile the largest reduction of the lowest resilience school (So 2 An Dong primary school) was recorded in the decrease of human resources, which fall from 3.50 in 2011 to 2.40 in 2013.

Table 4.12 The top ten variables ranked as the most important for DRRE in the schools

Variables (as of 2011)		Important rate	Variables (as of 2013)		Important rate
5.1.2	Severity of typhoons	4.31	5.1.2	Frequency of floods	4.28
5.3.1	Location of schools	4.25	5.2.2	Frequency of typhoons	4.28
4.1.4	Availability of early warning system from local government	4.22	2.1.5	Sharing of school emergency procedure and disaster preparedness plan to teachers and staff	4.06
5.2.2	Frequency of typhoons	4.11	5.3.1	Location of schools	3.97
2.1.5	Sharing of school emergency procedure and disaster preparedness plan to teachers and staff	4.00	2.3.4	Sharing of school's disaster preparedness and emergency management plan for Parents to understand their roles in case of disaster	3.94
1.1.2	Application of safety standards/building codes set by the government for school buildings	3.92	3.2.2	Dissemination of disaster related information (books, disaster newsletter, etc.)	3.81
2.2.5	Sharing of the school emergency procedure and disaster preparedness plan to students	3.92	4.1.4	Availability of early warning system from local government	3.81
3.3.1	per cent of school budget allocated for disaster related activities within school in 2010	3.92	1.2.3	Availability of the emergency supplies (ex. emergency bag, storage food and water, flashlight…)	3.78
5.1.1	Severity of floods	3.89	2.2.5	Sharing of the school emergency procedure and disaster preparedness plan to students	3.78
5.2.1	Frequency of floods	3.89	2.3.3	Availability of school-home emergency notification system	3.78



(a) (b)

Figure 4.16 Differences between the change in resilience of the highest (a) (Phu Hoa primary school) and the lowest (b) (So 2 An Dong primary school)

In summary, the findings from change of school disaster resilience level has proved that among five dimensions, Human resource is the most important factor contributed to the overall resilience of the education sector. Training for teachers, students, as well as involvement of Parents in disaster risk reduction activities need to be enhanced through development of school strategies but also through teaching and learning activities in schools. Compare to the quickly change of human resource, particular teachers' factor, the external relationships are difficult to be improved, thus focus on reinforcement of external relationships are also crucial for the increase of educational resilience. There is a need for a strategy to manage the relationship between school and community, to prevent the downward trend of this factor in the face of urbanization and development. Organization of outreach activities from schools to community under the form of extra-curricular can be considered as a potential solution, which will not only help to improve knowledge of students on the local conditions, but also to strengthen and sustain the relationship between school and community. This issue will be discussed more in detail in the Chapter 6 of this thesis.

4.4 SDRA in Da Nang City

4.4.1 Context of Da Nang City

Natural condition

Da Nang's topography is dominated by the steep mountain range to the north and northwest, featuring peaks ranging from 700 to 1,500 meters in height, and low-lying coastal plains to the south and east (Da nang PPC 2012). Da Nang is located in the zone of typical tropical monsoon, temperate and equable climate. The city's weather bears the combination of the north and the south climate characters with the inclination to the former. There are two seasons: a typhoon & wet season lasting from September through March and a dry season lasting from April through August. Average temperature is about 26^0C, the highest is 28-30^0C in June, July and August; the lowest is 18-23^0C in December, January and February. In Ba Na Mountain, the temperature is 20^0C. Average rainfall is 2,505mm per year that concentrates during October and November. The average humidity is 83.4 per cent; highest in October and November the average of 85.67 to 87.67 per cent; lowest in June and July, the average of 76.67 to 77.33 per cent. The average annual rainfall is 2504.57 mm / year;

highest rainfall on October and November the average of 550 - 1,000 mm / month; lowest in months January, February, the average from 23-40 mm/month. Average hours of sunshine is 2,156 hours; most on may and June, the average of 234 to 277 hours/month; least on November and December, the average from 69 to 165 hours/month (Da nang PPC 2012).

Socio-economic conditions

The highest rate of urbanization took place in Da Nang City between 1997 and 2009 in terms of infrastructure projects, real-estate development, and expansion of service sector industries, particularly in coastal areas. The urban population in Da Nang City has doubled from 426,100 people in 1995 to 849,000 people in 2012 (Figure 4.15). The total population of Da Nang City in 2009 was 822,339, which is a 1.93 per cent increase from the previous year. The city is expected to more than double from current levels to reach 1.5 million people by 2025 (GSO 2013b). The economic growth rate (GDP) of the city reached 9.98 per cent in 2000 and 11.2 per cent in 2009. It is projected to reach 11.6 per cent in 2010 and approximately 12-13 per cent in 2020.

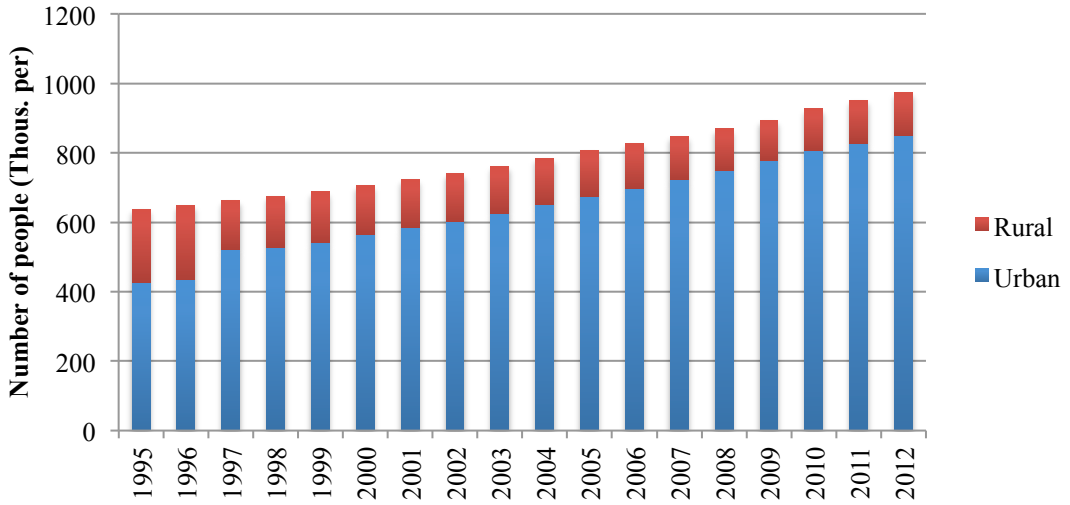


Figure 4.17 The population of Da Nang from 1995 to 2012 (Source: GSO 2013)

Da Nang's GDP currently accounts for approximately 1.6 per cent of the country's GDP and is projected to account for 2.8 per cent by 2020. GDP per capita (current prices) in 2010 is 33.2 million dong, which reflects a 4.8 times increase from 6.9 million dong per capita in 2000 (ACCCRN 2011). Together with the rapid urbanization and economic development, Da Nang is facing many environmental issues such as environmental degradation, air and water pollution, increased

frequency and severity of natural disasters, particularly floods and typhoons (Yoshizumi 2007, ACCCRN 2011)

Natural disaster profile and impacts to education sector in Da Nang City

Being a coastal city with three quarters of territory made up of hills and mountains, Da Nang is prone to frequent typhoons and heavy rainfall causing widespread flooding. There is an increasing in the number of typhoons direct and indirectly hit Da Nang City. From 1990 to 1999, there were 4 extreme floods in the city. Among them the flood in early November of 1999 inundated almost the whole city. The aggregated rainfall was recorded at 2,000-2,500mm. During the floods, water levels on all rivers exceeded the third alarm levels. Even water levels on some rivers were equivalent to or excessive of historical flood levels (GoV 2005b). During the same periods, there was only one typhoon recorded; however, in the last 10 years (2000 to 2010) there have been 21 typhoons directly hitting Da Nang with an average of two typhoons annually. For example, there was one typhoon (level 9) in 2000, two typhoons (level 11) in 2001; two typhoons (level 6, 7) in 2002; two typhoons (level 6, 7) in 2004; two typhoons (level 12, 13) in 2006; two typhoons (level 10, 12) in 2007 (ACCCRN, 2011). The most damaging typhoons occurred in 2006 (Figure 4.16), namely Xangsane, costing over 5 trillion VND (about 300 million USD), with more than 5,000 houses washed away, 166,000 homes damaged and 2,760 school affected (CCFSC, 2007). Three years later in 2009, Typhoon Ketsana (Figure 4.17) directly hit south of Da Nang and left eight people dead, ninety-six injured, and damages costing 495 billion VND (about 25 million USD) (CCSFC, 2010).

Figure 4.18 Nguyen Phan Vinh Primary schools in Son Tra District, Da Nang City was unroofed by typhoon Xangsane 2006

Figure 4.19 Impacted by typhoon Ketsana in 2009 to Tran Binh Trong primary school in Lien Chieu District, Da Nang City

(Source: provided by schools)

In October 2013, Da Nang City was strongly hit by the typhoons Nari (Figure 4.18), which made landfall in Danang and Quang Nam areas with a Category 1 level on 15 Oct. It is reported that there was 11 injuries, 122 house collapsed, 5449 house damaged/unroofed, 13 public building damaged in Da Nang City (UNCT 2013).

(Source: "Khung Cảnh Tan Hoang Sau Bão Của Nhiều Trường Học ở Đà Nẵng" 2013)

Figure 4.20 Hoang Van Thu primary school damaged by the typhoon Nari 2013

Aside from floods and typhoons, Da Nang City was also impacted by droughts, river bank and coastal erosion, and saline intrusion. Under the impacts of increased temperature and change of precipitation, droughts in Da Nang have become prolonged with more severe intensity. During the 33 years from 1960 to 1983, there was only one severe drought in 1983; in the period from 1988 to 2006 there were four severe droughts, in 1988, 1990, 1998 and 2002. The drought in 2002 (considered the worst in 20 years) lasted from May to mid-August resulting in saltwater incursion far up-river in the Cau Do, Cam Le, Vinh Dien, and Cu De and drying of dozens of lakes around the city. The main causes of river bank and coastal erosion are, respectively, change of precipitation causing change of water flow and storm surge coupled with sea level rise due to typhoons. Because intensity and time of rains change in the rainy season, the issue of riverbank erosion occurring in this period of time is extremely serious. In recent years during the 9 months of dry season, there have been 7 months that salinity intrudes far upriver into areas such as An Trach dam (Hoa Tien Commune, Hoa Vang District) and Cau Do water plant (the main water supply for Da Nang City) with salinity exceeding 10 ‰ (ACCCRN 2011). In general, the main socio-economic climate vulnerabilities in Da Nang are loss of human life and health; loss of land; reduction in crops and livestock productivity; shortage of water supply (for drinking, domestic usage, and manufacturing); destruction of traffic and irrigation works; destruction of houses, schools, factories, and hospitals; environmental

pollution; damage to fishing boats and livelihoods of local people; and disruption of manufacturing, business, cultural and social activities (Figure 4.19).

Climate change impact	Level of vulnerability						
	Loss of land	Deterioration of livelihoods and social issues	Shortage of water	Destruction of traffic/ irrigation works	Destruction of houses and public works	Loss of human life and health	Environmental pollution
Typhoon	++	++	+	+++	+++	++++	+
Flood	++	++	+	+++	+++	++	++
Drought	+	+++	++++	+	+	+	++
River bank and coastal erosion	+++	++	-	++	+++	+	+
Saline intrusion	+	+	+++	+	-	+	+

(a)

Climate change impact	Level of vulnerability							
	Loss of land	Deterioration of livelihoods and social issues	Reduction in crops and livestock productivity	Shortage of water	Destruction of traffic / Irrigation works	Destruction of houses and public works	Loss of human lives and health	Environmental pollution
Typhoon	+++	++	+++	+++	+++	+++	++++	+
Flood	+++	++	+++	+++	++	++	++	+
Drought	+	++	+++	++++	-	-	++	++
River bank and coastal erosion	++++	+	+++	-	++	++	+	+
Saline intrusion	-	+	++	+++	-	-	+	-

(b)

Note: ++++: extremely high level of vulnerability; +++: high level of vulnerability; ++: medium level of vulnerability; +: low level of vulnerability; -: invulnerable

Figure 4.21 Matrix of climate vulnerability assessment in the past and present (a) and in the future (b) of Da Nang City (Source: ACCCRN 2011)

4.4.2 Education system in Da Nang City

Da Nang is considered as the largest education center of Central Vietnam and the third largest in the country. It is in top five provinces have the highest literacy rate and net enrolment rates at primary level (GSO Vietnam, 2011). The province has completed universal primary education since 2000, with 99 per cent of students has schooling at the right age, 100 per cent of schools held two sessions/days and 85 per cent of students have full-day schooling, as well as 100 per cent students completed primary education and continue to secondary education (as of 2010) (Da Nang DoET, 2009).

In the academic year of 2011-2012, the total number of both public and private primary schools was 103 accommodating about 63,604 students locating in seven districts (Table 4.13). The largest number of primary schools is in Hai Chau District, account for 21 per cent, which is followed by Hoa Vang District with 18 per cent of the total primary schools. The percentage of urban primary schools is 82 per cent, which located mainly in coastal and plain areas. Accordingly, the number of primary students in urban areas is 86 per cent, and of teachers is 80 per cent. Table 4.14 shows the school sizes and class sizes in the different districts in Da Nang City. Notably, there is an unbalance between the classroom/school ratio and classes/school ratio in Hai Chau (9.00 and 20.30, respectively) and Ngu Hanh Son District (7.20 and 17.10 respectively). This illustrates an extremely lack of infrastructure in accommodating the huge number of students, which is averagely 34.55 in urban schools and 26.23 in

rural schools. The teachers/class ratio in all urban districts is lower than national average (1.5 as defined by MoET in 2013). It was assumed that the school sizes and class sizes, as well as students/teacher are better in rural schools compare to urban schools.

Table 4.13 Number of schools, classes, classrooms, teachers and students by districts in Da Nang City (as of AY 2011-2012)

	Hai Chau	Thanh Khe	Son Tra	Ngu Hanh Son	Lien Chieu	Cam Le	Hoa Vang	Total
Number of wards/communes	**13**	**10**	**7**	**4**	**5**	**6**	**11**	**56**
Number of schools	**38**	**28**	**25**	**17**	**22**	**17**	**33**	**180**
Primary	23	15	14	10	13	9	19	103
Lower secondary	11	10	7	5	6	7	11	57
Upper secondary	4	3	4	2	3	1	3	20
Number of classes	**970**	**496**	**591**	**313**	**467**	**339**	**703**	**4105**
Primary	467	356	262	171	260	172	378	2066
Lower secondary	288	25	191	97	136	131	216	1310
Upper secondary	215	115	138	45	71	36	109	729
Number of classrooms	**617**	**566**	**493**	**231**	**471**	**307**	**615**	**3300**
Primary	207	245	224	72	290	126	306	1470
Lower secondary	240	222	155	104	115	160	232	1228
Upper secondary	170	99	114	55	66	21	77	602
Number of teachers	**1753**	**1246**	**1117**	**576**	**798**	**615**	**1317**	**7422**
Primary	658	484	391	244	364	255	582	2978
Lower secondary	613	501	393	228	265	274	480	2754
Upper secondary	482	261	333	104	169	86	255	1690
Number of students	**39509**	**27723**	**21026**	**10810**	**16565**	**12839**	**22734**	**151179**
Primary	17521	13387	8993	5259	8196	6118	9914	69388
Lower secondary	11352	8794	6302	3574	5072	4947	7701	47715
Upper secondary	10636	5542	5731	1977	3297	1774	5119	34076

(Source: DoET Da Nang, 2011)

Table 4.14 School sizes and class sizes in the seven districts of Da Nang City

	Hai Chau	Thanh Khe	Son Tra	Ngu Hanh Son	Lien Chieu	Cam Le	Hoa Vang
Classroom/school	9.00	16.33	16.00	7.20	22.31	14.00	16.11
Classes/school	20.30	23.73	18.71	17.10	20.00	19.11	19.89
Teacher/class	1.41	1.36	1.49	1.43	1.40	1.48	1.54
Students/class	37.52	37.60	34.32	30.75	31.52	35.57	26.23
Students/Teacher	26.63	27.66	23.00	21.55	22.52	23.99	17.03

(Source: DoET Da Nang, 2011)

According to DoET Da Nang, the education system from primary to high school experienced a slightly decrease in number of classes and number of school students and is expected to go down in the next few year unitl 2020 (DoET Da Nang 2012).

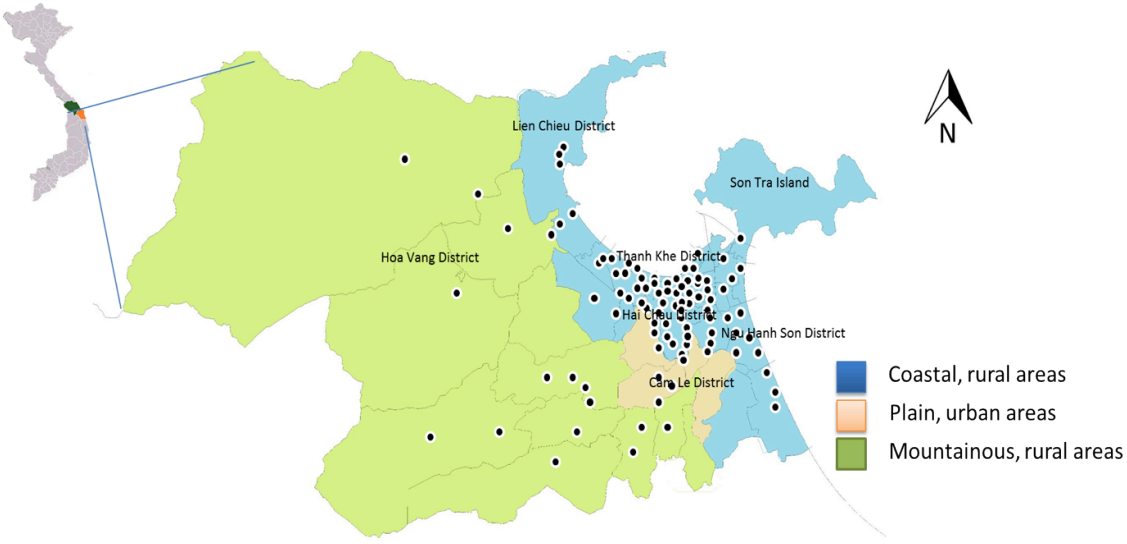


Figure 4.22. Map of primary schools in different geography location Da Nang City

Hai Van primary school, Lien Chieu district (Coastal areas)

Hoa Phuoc primary school, Hoa Vang district (Mountainous areas)

Be Van Dan Primary school, Thanh Khe District (coastal area)

Emergency supplies storage in primary school

Figure 4.23 Photos of primary schools in different regions in Da Nang City

4.4.3 Overall SDRA results in Da Nang City

Of the 100 questionnaires distributed, 76 questionnaires were fully completed and returned (76 per cent of total sample). The overall resilience of the whole city and of each region was depicted using pentagon shaped graphs. Details of SDRA analysis results of 7 districts and 76 primary schools in Da Nang City are provided in Appendix 8 and 9, respectively.

4.4.3.1 Overall resilience

Result of the average score shows a medium level of primary education in Da Nang City with the highest contributions from physical conditions and human resources. The other two dimensions, institutional issues and external relationships, are slightly above average while natural conditions scores lowest (Figure 4.22). These qualifications are according to the scale of five categories from very high ($4.2<x\leq5.0$), high ($3.5<x\leq4.2$), medium ($2.7<x\leq3.5$), low ($1.9<x\leq2.7$), very low ($1.1\leq x\leq1.9$) (x is weighted score).

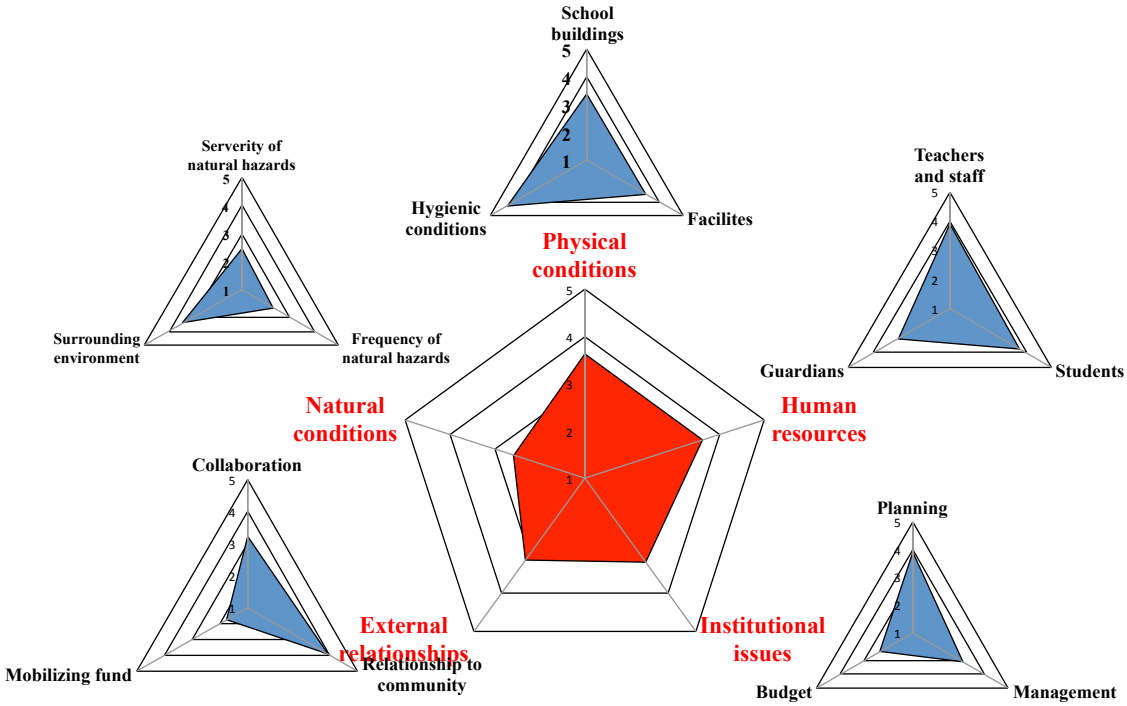


Figure 4.24 Overall resilience of primary education in Da Nang City

4.4.3.2 Physical condition

The physical dimension scores highest among five dimensions owing to high scores in hygienic and environmental conditions and medium scores in school buildings and facilities and equipment parameters.

With regard to school safety standards, results show that nearly 50 per cent of primary schools in Da Nang are built without proper emergency exit doors and 42 per cent do not met the standards of function as evacuation shelter for community in emergency period. There is 100 per cent of primary schools in this study report severe structural and non-structural damages by climate-related disasters in the last five years. However, not more than 32 per cent of schools have capacity to quickly recover after a disaster leading to educational interruption and numerous challenges to school teachers and students in achieving yearly educational goals.

In contrast to the two aforementioned parameters, the hygienic and environmental conditions parameter scores very high, and is the highest among fifteen parameters examined in this study. According to the Department of Natural Resource and Environment, Da Nang has provided significant subsidies for the operation of the waste disposal services and tariff levels are extremely low. Additionally, awareness of people on hygienic and environmental conditions is largely improved since the "Green city" campaign began in 2008. There are more environmental protection campaigns held in Da Nang than in any other cities in Vietnam.

4.4.3.3 Human resource

Among the three parameters of human resources, teachers and students contributed most to the medium resilience, while Parents have the least contribution.

The result shows that there is a nexus between level of damage by disaster and knowledge of teachers and staff on disasters. With more than 93 per cent of teachers equipped with proper knowledge and awareness on disaster related issues, only 18.4 per cent of teachers and staff said that they are impacted by disasters. Despite nearly 90 per cent of schools stressing the importance of disaster training for teachers, there are only 68 per cent of schools, which provides regular disaster training courses to teachers. This limits the capacity to sustain knowledge and awareness of disaster issues to future generations in the schools.

The analysis of Students parameter reveals a big gap between knowledge on disaster issues and its translation into actual action to reduce disaster risk at school level. More than 93 per cent of students are reported to have basic knowledge and awareness on disaster issues, yet 40 per cent of students are affected by disasters. In addition, more than 50 per cent of schools report that less than half of total number of

students has the opportunity to participate in a disaster-training course. This highlights the need of linking theory and action through practices of disaster activities in schools toward the improvement of disaster risk reduction education.

More than 61 per cent of schools in this study stress the importance of the regular Parents-Teacher Association (PTA) meeting. However, there is no disaster related training designed for Parents, which leads to the lack of knowledge and awareness on disaster issues among Parents. It is likely because more than 50 per cent of schools consider the provision of disaster training for Parents as not important.

4.4.3.4 Institutional issue

The score of institutional issues is not so high compared to other dimensions because of a medium score in planning and management and a very low score in budget.

About 90 per cent of schools consider incorporation of disaster risk reduction into school planning and syllabus as important, while only 77 per cent of schools prioritize incorporation of disaster risk reduction into school regulation. According to the primary education system of Vietnam, schools that meet all the requirements of teaching capacity can develop optional education programs pursuant to the regulations of the DoET aside from the main curriculum. Following this system, most primary schools in Da Nang City have disaster components integrated into some subjects such as Vietnamese, Nature and Society (for grade 1, 2 and 3), and Geography and Science (for grade 4 and 5) to provide a basic knowledge of disaster related issues for primary students.

Another issue found in this study is that most schools focus on preparedness and response than recovery after a disaster. There is 96 per cent of schools have their own preparedness plans while about 84 per cent of schools have recovery plans. Also, 97 per cent of schools rate the development of preparedness plan as important while only 60 per cent of schools stress the importance of recovery plan.

The score of the budget parameter is the lowest among three parameters of institutional issues and the second lowest in all fifteen examined parameters. This is most likely because of the limited financial resources allocated for disaster management at primary education level. An investigation on the average educational expenditure at primary level of Da Nang City in the four consecutive financial years

from 2007 to 2011 shows that apart from the regular expenditure on salary and allowances, 33.2 per cent was spent on development issues (31.3 per cent), target programs (1.9 per cent), and other irregular activities including disaster related activities (0.1 per cent). Hence, there is a lack of budget for implementation of disaster activities at school level. Moreover, financial investment for primary education counted per school students is the lowest compared to other levels.

4.4.3.5 External relationship

The results of the external relationships dimension present a different pattern of high score in collaboration, medium score in relationship to community and especially low score in mobilizing fund. The mobilizing fund parameter is the lowest among 3 parameters of external relationship and also the lowest among fifteen examined parameters. It is found that fund from local Government and PTA association is many times more than from local community and other organizations in both urban and rural areas. According to the annually financial plan of DoET DN, the fund expected from PTA is about 197 billion VND (equivalent to 9.5 million USD) accounts for 3.4 per cent of the total, which is double that of the expectation from NGOs and other organizations which is about 100 billion VND (equivalent to 4.8 million USD) accounts for 1.7 per cent of the total (as of 2010).

4.4.3.6 Natural condition

Da Nang is one of the most natural disasters prone areas, especially climate related disasters such as typhoons, floods, droughts, and sea intrusion, among others. This explains why natural conditions score lowest among five dimensions with low scores in severity/frequency of natural disasters and a high score in surrounding environment as more than 80 per cent of schools are located within 5 km from social services such as police office and health center.

4.4.4 Results base on locations of schools

Collected data includes 59 urban schools (50 in urban coastal and 9 in urban plain land) and 17 rural schools. Among 59 urban schools, only 29 per cent of schools are highly resilient, 66 per cent are moderately and 5 per cent are low resilient. While among 17 rural schools, 24 per cent of schools are categorized to have high resilience and 76 per cent are moderate. From this, it can be assumed that the educational resilience, on average, is higher in rural areas than in urban areas (Figure 4.23).

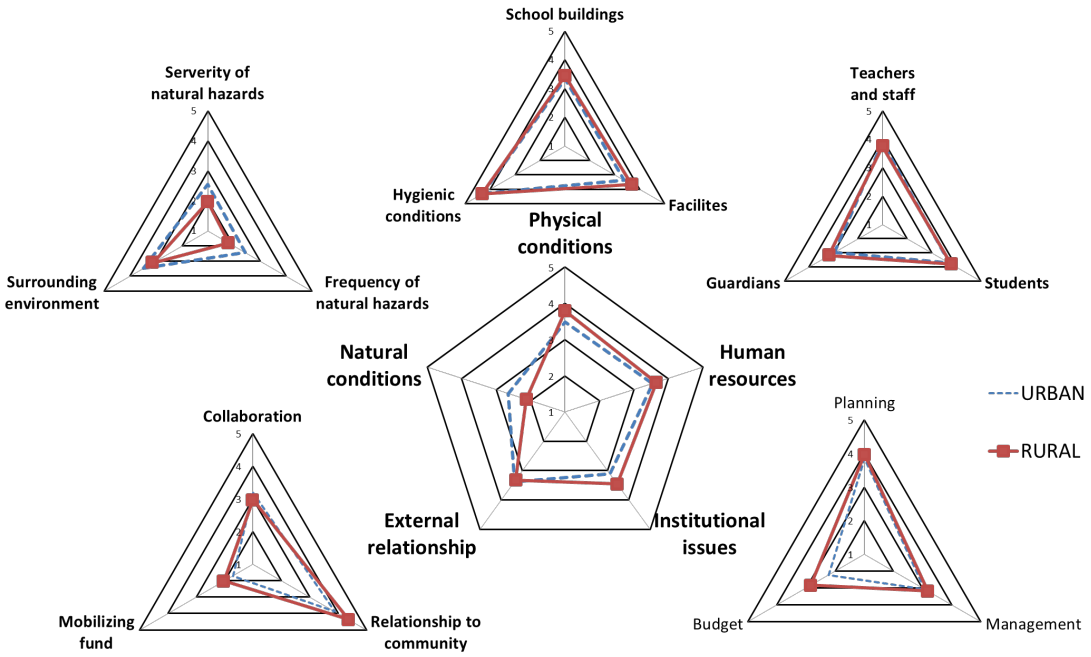


Figure 4.25. Comparison between the educational resilience of primary schools in urban and rural areas in Da Nang City

Table 4.15. Correlation coefficient between dimensions and overall resilience

	Physical condition & Overall resilence	Human resource & Overall resilence	Institutional issue & Overall resilence	External relationship & Overall resilence	Natural condition & Overall resilence
Urban, plain	0.78	0.73	0.73	0.35	0.41
Urban, coastal	0.59	0.69	0.58	0.47	0.49
Rural, mountainous	0.64	0.73	0.79	0.69	0.15

In order to understand the factors impacts to schools' resilience in different regions, correlation analysis was done between the five dimensions and the overall resilience score (Table 4.15). Results show that urban plain area has the highest contribution from physical conditions, while that of urban coastal is human resources. Both urban plain and coastal areas have the lowest contribution from external relationships. Meanwhile, for rural mountainous area, the external relationships play an important role, which contribute the largest to the overall resilience.

The following part will examine more in details the role of parameters and variables belongs to each dimensions. Implications from the analysis will provide an

understanding on the factors impact to multi-aspects of disaster risk reduction education practices in various regions.

Table 4.16 SDRA values by districts in Da Nang City

	Thanh Khe	Son Tra	Hai Chau	Lien Chieu	Ngu Hanh Son	Cam Le	Hoa Vang
Number of schools	7	14	11	10	8	9	17
P1	3.83	3.20	3.12	3.88	3.09	3.04	3.44
P2	3.42	3.00	3.75	3.62	3.23	3.34	3.68
P3	4.14	4.28	4.58	4.03	4.19	4.47	4.33
Physical conditions	3.78	3.38	3.64	3.89	3.49	3.55	3.79
H1	4.30	4.16	4.19	3.39	3.24	4.01	3.76
H2	3.72	3.83	4.18	3.46	3.08	3.91	3.79
H3	3.17	2.96	2.94	3.01	2.93	2.83	3.19
Human resources	3.85	3.79	3.86	3.27	3.16	3.74	3.64
I1	3.69	3.91	3.69	3.85	3.78	4.14	3.97
I2	3.29	3.10	3.12	3.07	2.77	3.12	3.18
I3	2.22	2.47	1.91	2.67	1.70	2.22	2.84
Institutional issues	3.18	3.13	2.97	3.13	2.78	3.45	3.45
E1	3.10	3.32	3.07	2.95	3.25	3.40	3.27
E2	3.34	3.70	3.78	4.32	3.81	4.27	4.07
E3	1.57	1.73	1.87	1.73	1.58	1.60	2.02
External relationships	2.80	3.09	2.92	3.12	3.18	3.29	3.32
N1	2.92	2.23	2.62	2.66	2.28	2.92	1.97
N2	2.68	2.41	2.62	2.42	2.36	2.12	1.80
N3	3.86	3.11	3.76	3.41	3.48	3.56	3.12
Natural conditions	3.17	2.44	2.71	2.58	2.51	2.77	2.12
SDRA	**3.36**	**3.17**	**3.22**	**3.20**	**3.02**	**3.36**	**3.27**
	Urban coastal					**Urban plain**	**Rural mountainous**
	3.18					**3.16**	**3.07**

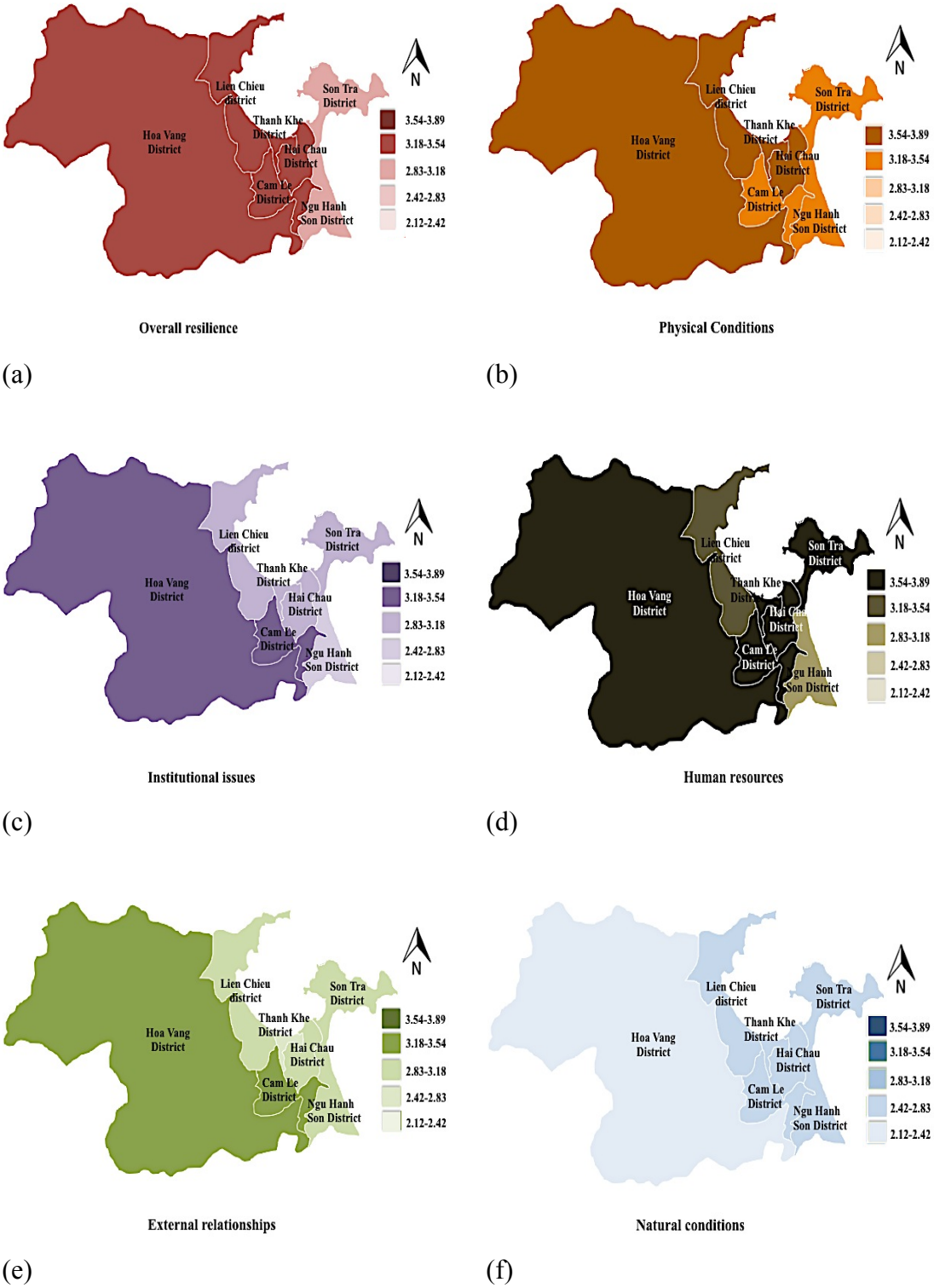


Figure 4.26. The spatial map of educational resilience values in different districts in Da Nang City

As Table 4.16 shows, schools located in urban plain have the highest resilience score, which followed by rural mountainous areas. Urban coastal area has the lowest resilience among the three categorized regions.

The physical conditions of rural schools are slightly higher than that of urban schools despite the fact that urban schools have stronger infrastructure (Figure 4.25b). More than 90 per cent of school buildings in urban areas have two storeys or more. Meanwhile, there is no school building with three storeys in rural areas and more than 50 per cent of schools have one-storey buildings. However, it is worth to note here that the physical score indicates the capacity of school to meet the physical demand of teachers and students before, during and after a disaster. The challenge between capacity of schools and the over population of students in urban areas contributed to the lower scores of school buildings and facilities in urban compare to rural areas. In urban plain, schools show higher score on regular check in buildings and hazardous material. These two variables coordinate well with the overall resilience of urban schools. Meanwhile, safety building code has important contribution for schools in rural mountainous. Also these schools have improved emergency supplies and recycle system.

The human resources vary sharply with scores ranging from 1.69 to 4.62 (Figure 4.25c). This pattern is highlighted in urban areas as the top highest and lowest scores of human resources are found in urban schools. There are 74 per cent of schools that reports that less than 50 per cent of teachers and staff, on average, participate in disaster training courses. This number is reported to be higher in urban areas (78.6 per cent) than in rural areas (21.4 per cent). For teachers in urban schools, with a class size (22 students/class) nearly double that of rural schools (14 students/class), it often counts to 50 to 60 hours of work per week. This means that teachers in rural areas are likely to have more time for extra activities including disaster related activities. Except in urban plain, the involvement of Parents in disaster activities has the important contribution to enhanced resilience of schools. In both urban coastal and rural mountainous areas, disaster-training program for teachers and staff, participation of teachers in disaster program and knowledge of students on disaster components have decided the highest score of school resilience. It is the sharing of disaster preparedness plan for teachers and staff that matters in rural schools. Most schools in rural mountainous stress the participation in disaster program and sharing of disaster preparedness plan for Parents.

Under a school context, institutional resilience is assessed in terms of disaster planning, management and allocation of budget for disaster activities. Rural scored

slightly higher than urban in all the three parameters, resulting in a higher score of institutional resilience in rural schools (Figure 4.25d). Most of the urban schools stress the importance integrating disaster risk reduction into school planning, regulation and syllabus (more than 80 per cent), yet not more than 60 per cent of rural schools focus on mainstreaming disaster risk reduction. On the other hand, rural schools have better preparation for disaster with 100 per cent of rural schools developed preparedness plan and nearly 90 per cent of schools have recovery plan. Results indicate the following factors that have the most important impact on school resilience in rural mountainous schools: preparedness and emergency management plan, school early warning system, provision of disaster information, budget allocated for renewing/repair/rebuilding after disaster and budget allocated for supporting the students who have special need.

The variation of external relationship value is not only evident across the entire city with the distribution of the top seven lowest external relationships in seven different districts but is also present within each area (Figure 4.25e). In particular, the lowest and highest scores of collaboration and relationship to community were recorded in the same area, namely urban plain land area. There are nearly 90 per cent of rural schools in this study have regular meetings with the local authority, at least one meeting per year, to specifically discuss about disaster related issues. More than 80 per cent of rural schools stress the importance of a communication system with other schools. In contrast, due to more professionalized and centralized character, urban school tend to reduce its power as a valuable community resource, resulting to weak collaboration between school and local community in urban areas. In contrast to urban-rural pattern, the average of external relationships was recorded nearly same among the three areas with little range of scores. However, correlation analysis shows a large variation in the contribution of variables to the overall school resilience in different regions. In order to strengthen the external relationship, communication system, cooperation with local government and support from community are important in urban coastal areas. Meanwhile, meeting with local DoET, communication system, early warning from the local government, participation of school in disaster activities held by local community, school involvement in disaster management plan of local community, and fund from Parents associations are vital for the enhancement of school resilience in rural mountainous areas.

The variation in natural conditions lies on experiences of schools about recent extreme events and the distance between schools with local public service agencies (Figure 4.25f). In coastal and mountainous areas, school resilience is highly dependent on the nature of natural hazards and surrounding environment. There is an annual average of 1 – 2 typhoons and 2 - 3 floods of level 3 or higher directly hitting the city (ACCCRN, 2011). Moreover, in recent years during the 9 months of dry season, there have been 7 months that salinity intrudes far upriver into areas such as An Trach dam (Hoa Tien Commune, Hoa Vang District). In contrast, schools located in plain are resistant to variation of natural conditions. Schools in coastal and mountainous share the same pattern whose contribution of severity and frequency of natural hazards and school locations have strong effects to school resilience. There are 100 per cent of schools located in rural areas report damages by flood many times per year in the last five years.

In general, the natural resilience is much lower in rural compare to urban areas, especially the value of surrounding environment. Urban schools are increasingly vulnerable because of trends such as rapid urbanization and growing population concentrated in highly exposed areas, especially in coastal zones. The rural areas account for 77 per cent of the total areas in Da Nang City but there is only 16.5 per cent of the total number of schools located in rural areas. Geographical constraints face rural schools with rapid and severe hazards, while long distances from rural schools to local public service agencies possibly lead to isolation during a disaster. These disadvantageous conditions were reflected in the low score of natural resilience of rural schools.

4.5 Comparison between Thua Thien Hue Province and Da Nang City

Both Thua Thien Hue Province and Da Nang City located in Central Vietnam and are strongly impacted by disasters such as typhoons and floods. The two areas share the same topography including mountainous, plain and coastal areas. However, urbanization in Thua Thien Hue Province took place mainly in plain areas while Da Nang City recorded the highest rate of urbanization in coastal areas.

As can be seen from Figure 4.26, the average resilience of Da Nang City is higher than Hue Province. Among five dimensions, the largest variation was recorded in physical and human resources. In particular, the facilities and hygienic conditions in

Da Nang City differ from Hue Province. Besides, Da Nang City also possesses a number of better qualified teachers and staff who are trained or equipped with proper knowledge related to disaster risk reduction issues. There is not much variation between the institutional issues and external relationship. The natural dimension shares the same model, as both regions are vulnerable to disasters.

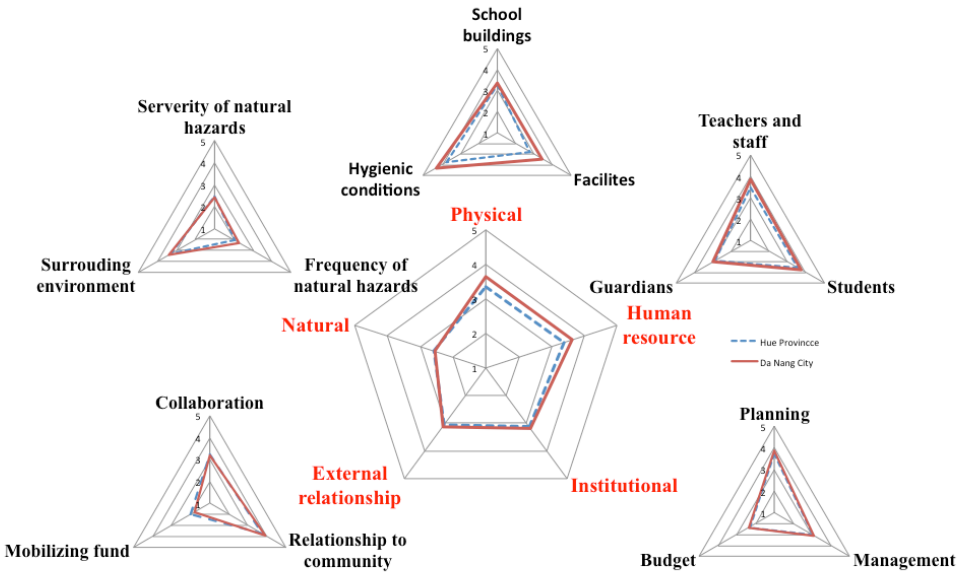


Figure 4.27. Comparison between of overall educational resilience in Thua Thien Hue Province and Da Nang City

Table 4.17 The resilience level in urban and rural of Hue Province and Da Nang City

	DN-rural	DN-urban	Hue-urban	Hue-rural
Physical condition	**3.79**	**3.58**	**3.48**	**3.23**
P1	3.44	3.31	3.54	3.13
P2	3.68	3.35	2.87	2.71
P3	4.33	4.28	3.92	3.61
Human resource	**3.64**	**3.62**	**3.51**	**3.3**
H1	3.76	3.89	3.55	3.45
H2	3.79	3.73	3.75	3.46
H3	3.19	2.98	3.12	2.80
Institutional issue	**3.45**	**3.11**	**3.19**	**3.07**
I1	3.97	3.85	3.82	3.64
I2	3.18	3.09	3.08	3.02
I3	2.84	2.21	2.41	2.29
External relationship	**3.32**	**3.07**	**3.11**	**3.02**
E1	3.27	3.19	3.24	3.19
E2	4.07	3.87	3.86	3.68
E3	2.02	1.69	2.07	1.96
Natural condition	**2.12**	**2.67**	**2.63**	**2.58**
N1	1.97	2.59	2.49	2.46
N2	1.80	2.45	2.14	2.06
N3	3.12	3.50	3.36	3.28
Overall score	**3.27**	**3.21**	**3.18**	**3.04**

Looking at the difference between rural and urban areas in Hue Province and Da Nang City, there is an interesting finding as all the dimensions unless Natural condition are higher in rural compare to urban areas in Da Nang City while upside trend was observed in Hue Province with higher resilience in urban than in rural areas (Table 4.17). Ranking the overall score of the four regions shows the ascending order from Da Nang rural, Da Nang urban, Hue urban, and Hue rural.

Figure 4.27 shows the disproportion between resilience scores in urban and rural areas in Hue and Da Nang. It was formulated based on results of minus average score of urban schools for that of rural schools. In Hue Province, urban schools scored higher than rural schools in all fifteen parameters, which is presented by positive value as in Figure 4.27. In contrast, Da Nang City has lower scores of urban areas than of rural areas in most of the parameters, which is illustrated by negative value as in Figure 4.27. It is worth to note that urbanization is facing disaster risk reduction education with both advantages and disadvantages. However, evidences from the results have proved the negative impacts of the rapid urbanization in Da Nang City to the educational disaster resilience.

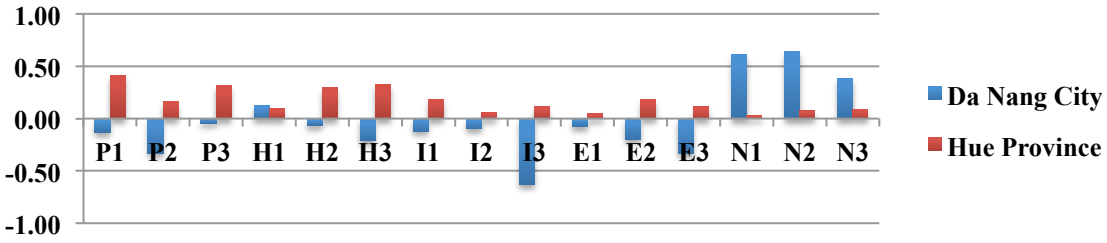


Figure 4.28. The comparison between the gap of urban schools and rural schools in Hue Province and Da Nang City

Results from SDRA analysis of schools in different urban and rural regions in Hue Province and Da Nang City also provides important understanding on strengths, weaknesses, opportunities and threats (SWOT) of DRRE practices. High score of a variable implicates strong capacity of school on that issue, for example, urban schools in Da Nang City score high in variables measuring collaboration between school and local government, which can be considered as one strength of school in promoting DRRE. Meanwhile, low score of a variable illustrates the weakness of school on that issues, for example, urban schools in Da Nang City has low score in variables measuring budget related issues such as budget allocation for disaster risk reduction activities, then it is assumed that one of urban schools' weakness is limited budget for

disaster risk reduction activities in school. Similarly, high or low important rate of a variable means that schools either prioritize or underestimate that issue. Accordingly, it can create both opportunities and threats for implementation of DRRE in practice

Table 4.18 summarizes the analysis of strengths, weaknesses, opportunities and threats of both urban and rural schools based on the analysis of high/low score and important rate from SDRA assessment. Results shows that the highest resilience, rural schools in Da Nang City, has stressed on some key aspects of human, institutional and external relationship issues. For example, to improve human resources, they have focused on enhance teacher capacity through teacher training; for institutional issues, integration of disaster risk reduction into school curriculum, development of disaster risk reduction materials and set up earlier warning system in schools are highlighted; to improve external relationships, the schools has established a strong relationship between school and community, simultaneously strengthened schools' capability to be used as evacuation for community. As a result, despite the limited financial supports from outside resources and severe impacts of disasters such as typhoons, salinity, and heat waves, the rural schools in Da Nang City show the highest level of resilience to disasters among regions. However, although sharing the same difficulties of financial constraints and strong damaged by disasters, urban schools illustrate a less resilient level. It is due to their foci were more on structural measures such as carrying out frequent check for school buildings and facilities, food safety conditions, percentage of garbage dumbed daily, which is insufficient to achieve resilience. The pattern of rural-urban in Hue is quite different from Da Nang City. The two regions have designated the similar strategies, which focused specifically on advancing human resources such as increase teachers' capacity on disaster risk reduction teaching, enhanced students' knowledge on disaster risk reduction contents. However, despite the effort on improvement of teacher and students' knowledge on disaster risk reduction though disaster training, the damage caused by disasters to school teachers and students remains as one of the main challenges in both urban and rural in Hue Province. This highlights the improper or ineffective response causing vast of damages by disasters to school teachers and students. This findings are again highlighted when it is found that there is a lack of effective plan to bring disaster risk reduction into school curriculum in schools both in urban and rural areas in Hue Province, which resulted in a fail of translation from knowledge into proper actions to help students and teachers response to disasters. Particularly, in rural areas of Hue

Province, the integration of disaster risk reduction into school curriculum has been rated as not important for the improvement of school resilience. A notable threat for rural schools in Hue Province is that while reports on the impacts of salt intrusion exist in coastal areas, schools have not yet recognized its damages to school structure and facilities.

Table 4.18 Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis for schools in different areas in Hue Province and Da Nang

		Da Nang City		**Hue Province**	
		Urban	**Rural**	**Urban**	**Rural**
Positives	**Strengths**	-Sharing disaster preparedness plan for teachers and students -Enhanced collaboration with local government -Ensured food safety conditions -Daily garbage collection	-Enhanced teachers' ability on disaster risk reduction teaching -Improved students' knowledge and awareness on disaster risk reduction issues -Established school early warning system -Recognized the disaster risk reduction contents in the curriculum -Distribution of disaster risk reduction related materials -Improved the relationship between schools and communities through various activities -Strengthened schools' capacity to be used as evacuation shelter for community -Frequent check on school facilities and equipment -Daily collection of garbage to ensure hygienic conditions	-Enhanced teachers' ability on disaster risk reduction teaching -Sharing disaster preparedness plan for teachers and students	-Enhanced teachers and students' ability on disaster risk reduction teaching -Strengthened schools' capacity to be used as evacuation shelter for community

	Opportunities	- SMB has been aware on the integration of disaster risk reduction into school curriculum	-SMB has been aware on the importance of budget allocation for disaster risk reduction activities - SMB has been aware on the integration of disaster risk reduction into school curriculum -The needs of schools on application building code will be address by the project "Concrete school buildings" carried out by the city	-SMB has been aware on the importance of budget allocation for disaster risk reduction activities -The needs of schools on application building code will be address by the project "Concrete school buildings" carried out by the city	-SMB has been aware on the importance of budget allocation for disaster risk reduction activities -The needs of schools on application building code and enhanced schools to be evacuation shelter for community will be address by the project "Concrete school buildings" carried out by the city
Negatives	**Weaknesses**	-Limited financial supports from outside resources -Limited budget allocated for disaster risk reduction related activities in school -Limited awareness on the involvement of Parents and disaster groups in school disaster risk reduction activities	-Limited financial supports from outside resources -Limited budget allocated for disaster risk reduction related activities in school -Lack of teaching and learning equipment to implement disaster activities in schools	- Severely damage by disasters on teachers - Lack of planning on integration of disaster risk reduction into school curriculum -Limited awareness on the involvement of Parents and disaster groups in school disaster risk reduction activities - Schools located near rivers/streams	- Severely damage by disasters on teachers and students - Lack of planning on integration of disaster risk reduction into school curriculum -Limited awareness on the involvement of Parents (i.e PTA meetings, sharing disaster plan with Parents, disaster risk reduction awareness raising for Parents) -
	Threats	-Threated by increasing frequency and severity of flood and typhoons -Impacted by rapid and unplanned urbanization	-Strongly impacted by typhoons, salinity and heat waves -Unpredictable impacted by speed of urbanization from urban areas (drainage school-age population, reduced number of qualified teachers, etc. to the city)	- Unpredictable impacted by floods and typhoons	- Not recognized the impacts of salinity while scientific report on salinity in some areas are available

*SMB: School Management Board

4.6 Key findings

The development of SDRA as a tool to assess the current level of educational resilience has different advantages in term of it application to practice. The combination between CDRI and E-HFA priorities provides the method with a well-structured and simple calculation using the formula named weighted means. In addition, since it is micro level assessment, it has the potential to overcome the limitation that Joerin (2012) pointed out in the study on CDRI that some parts of the CDRI would provide better results if conducted at local and micro level rather than at the city or zone level.

The study in Hue Province shows the current disaster resilience level of the primary educational system is quite high. However, the gap in resilience capacities between regions and even between schools within a region can be observed clearly. By identifying the different factors that affect resilient capacity of school, the SDRA has the potential to help Hue DoET in designing a better plan. It allows the SMB to assess school's capacity in the level of resilience along with socio-economic and environmental factors in order to minimize the gap and strengthen educational capacity to respond to disaster. With regard to awareness raising of educational stakeholders on DRRE, the SDRA can play as a tool for advancing educators' understanding of the multi-dimensional nature of resilience and its vital role in reducing disaster risk for the education sector.

Results from Da Nang case illustrate that rural schools have higher resilience compare to urban schools. School safety regarding school structure and location of school building are important, especially for schools located in coastal areas, whose resilience depends strongly on natural conditions. Most schools located in coastal areas have the lowest natural condition score as well as the lowest resilience score among the four areas. In particular, low resilience level is observed among schools located not more than 500 meters from coastal line such as Tran Binh Trong primary school, To Vinh Dien primary school. This finding has been affirmed in the study of Shaw and Takeuchi (2012) that the proximity of schools to the coastal line is a crucial issue causing vast losses and damage to schools. Also, it has been observed that schools which were aligned parallel to the coast have higher damage than those which lay perpendicular to the coast (Shaw and Takeuchi 2012). Accordingly, the issue of

school structure and school location is more critical in urban coastal area than urban plain, rural plain and rural mountainous areas.

Aside from strengths and weaknesses, study in Hue Province and Da Nang City found both opportunities and challenges in promoting DRRE. An opportunity would be to strengthen the school infrastructure and educational facilities and equipment using support from the project "Concrete school buildings" provided by the city/province. Another opportunity would be enhanced awareness of teachers and staff on disaster risk reduction related issues through awareness raising programs in the recent years, which ensures the improvement of DRRE in school. On the other hand, limitation on human resources and budget shortage are two among other hinder were found. First, budget allocated for disaster activities are in high competition with different types of budget and is not prioritized. The inadequate funding remains as one of the major issues for DRRE in schools when financial support from outside resources are limited, especially in case of Da Nang City, which deters educational planners and decision makers in establishing fund for contingency planning on DRRE. In addition, despite the number of trained teachers and students is quite high, many are not equipped with basic skills, local knowledge and practical actions which hinders them to take proper measures when disaster occurs. High turnover of teachers and staff in primary school (replaced every 5 years) is one of the reasons, which challenges to the transformation of knowledge from one generation to another. Therefore, it is a need for annual disaster training programs to improve practical skills in disaster response and to sustain human resources for educational system.

In conclusion, the SDRA can be used as an effective tool to set up school planning on DRRE which takes into account the different issues of physical, human, institutional, external relationships, and natural conditions will provide SMB and educators appropriate solutions to utilize strengths and minimize the blemishes in order to overcome challenges in promoting DRRE.

Within the context of a changing environment, it is difficult to find an approach that covers all changeable factors. Therefore, the method used in this study is not an absolute measure, but is a relative measure particular to school in a local community with specific conditions. In addition, because this assessment tool is applied at the school level, results are influenced by the local characteristics of each school. The SDRA tool, therefore, should be updated according to the change in local socio-economic and environmental conditions overtime. In other hand, although education

is a cultural issue and is very much rooted in the local context, there are still basic principles of education, which are universal and can be applied to different countries with possible customization. Accordingly, the set of resilience indicators in this study although developed along with the specific conditions of the primary education system in Central Vietnam can be utilized by modifying and making it compatible with other regions, in particular with developing countries who prone to floods and typhoons.

The next step of the research is the prioritization of actions base on results of SDRA for primary education system in Hue Province and Da Nang City. List of actions will be prepared based on the contributions each variable with the overall resilience and the level of importance rated by principals.

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Chapter 5 School-based approach in planning for disaster risk reduction education

In the Chapter 4, School Disaster Resilience Assessment (SDRA) was used to map the existing level of resiliency of all primary schools in Thua Thien Hue Province and Da Nang City. This Chapter describes the process of using SDRA as a tool for creating Educational Disaster Resilience Actions (EDRA) and developing plan for Disaster Risk Reduction Education (DRRE). This is a participatory process, which involves various stakeholders from schools (teacher, staff and students), family, community, BoET, DoET, Department of Health, academia, NGOs, and others. Schools will take lead in every phase of the planning process from creating action to propose implementation mechanism. The main output is the comprehensive planning of the implementation of DRRE in practice.

Contents

SCHOOL-BASED APPROACH IN PLANNING FOR DISASTER RISK REDUCTION EDUCATION

5.1 Introduction

The role of Disaster Risk Reduction Education (DRRE) in building resilience for education sector has been highlighted both in literature and in practice (as discussed in Chapter 3 and 4). In Viet Nam, although DRRE is put high on national agenda, its implementation is infancy and need cornerstones to hold up the structure. Planning and acting accordingly are the prime steps to bring about effective and efficient DRRE practices at local level.

Greater emphasis is being placed on the role of school in promoting a "culture of prevention" and creating disaster preparedness in community. This has been emphasized in both international framework and academic research (UNISDR 2006, 2007, Bonifacio *et al.* 2010, Gwee *et al.* 2011, UNISDR 2011, Takeuchi and Shaw 2012). The vital role of school has been stressed in the Education Law of Viet Nam as a basic unit of education system in which the goals of educating the Vietnamese into comprehensively developed persons will be achieved (GoV 2005). Shaw et al (2011) proposed that schools are key bodies to disseminate information about disaster risks, and most important, they can play a crucial role in incorporating disaster issues within the schools and within the communities for more comprehensive integration of DRRE. Bonifacio et al (2010) has stressed that schools are not only suitable for experiential learning in DRR but also an entry point to enhance the community network for possible disaster prevention and preparedness.

SDRA analysis has provided the baseline of the current conditions whereby entry points for DRRE toward enhancing educational resilience can be identified; strengths and opportunities can be utilized, gaps and challenges can be addressed. Through this micro-level assessment, school level context is established and integrated into general planning, which is crucial for the promotion of DRRE. In order to bring DRRE in practice, action plan for DRR in the education sector is needed. DRR action plan was defined by UNISDR (2009) as a document prepared by an authority, sector, organization or enterprise that sets out goals and specific objectives for reducing

disaster risks together with related actions to accomplish these objectives. According to this guide DRR plans should be guided by the HFA and considered and coordinated within relevant development plans, resource allocations and program activities. National level plans needs to be specific to each level of administrative responsibility and adapted to the different social and geographical circumstances that are present. The time frame and responsibilities for implementation and the sources of funding should be specified in the plan (UNISDR 2009).

School-based planning involves various stakeholders from school to community, government, and other organizations. Among that, schools take leading role in every phase of the planning process, from proposing the actions to prioritizing and defining the implementation mechanism. On this basis, leadership and prioritization are key factors in helping schools to manage internal and external resources for efficiently overcoming challenge and effectively promoting DRRE. Prioritizing actions will help schools identify key areas to be addressed in different planning schedule of short, medium and long term. Therefore, the expected output of the school-based planning is the prioritized actions with defined roles of stakeholders, and time frame classified in short, medium and long term. The approach used in this study for creating DRRE plan is establishing workshops involving multi-stakeholders whose contribution is important for enhancing educational resilience.

5.2 School-based planning for DRRE

SDRA was developed not only for assessing the level of school resilience to disaster, but also has potential to function as an effective planning tool for building resilience to disasters in the education sector. Fernandez et al. (2011) has emphasized the role of planning for DRR action as a way to refocus DRR missions, to highlight new opportunities and threats, as well as to innovate future thinking and bring words into action (Fernandez *et al.* 2011).

This study adopted the Climate Action Planning (CAP) process developed from the capacity building program held in cooperation of Kyoto University, CITYNET, Tokyo Development Learning Center of the World Bank, UNISDR, and Asian Regional Task Force on Urban Risk Reduction (Shaw *et al.* 2008). This guideline has defined six steps for CAP which is uncomplicated and straightforward process yet

intimately tie to the local values, tradition, decision-making pathways, human resource and socio-economic conditions. The six steps include (Figure 5.1):

- Step 1: Resilience mapping
- Step 2: Setting priorities
- Step 3: Creating the action plan
- Step 4: Implementing the action plan
- Step 5: Evaluating the results
- Step 6: Updating the action plan, and replicate step four

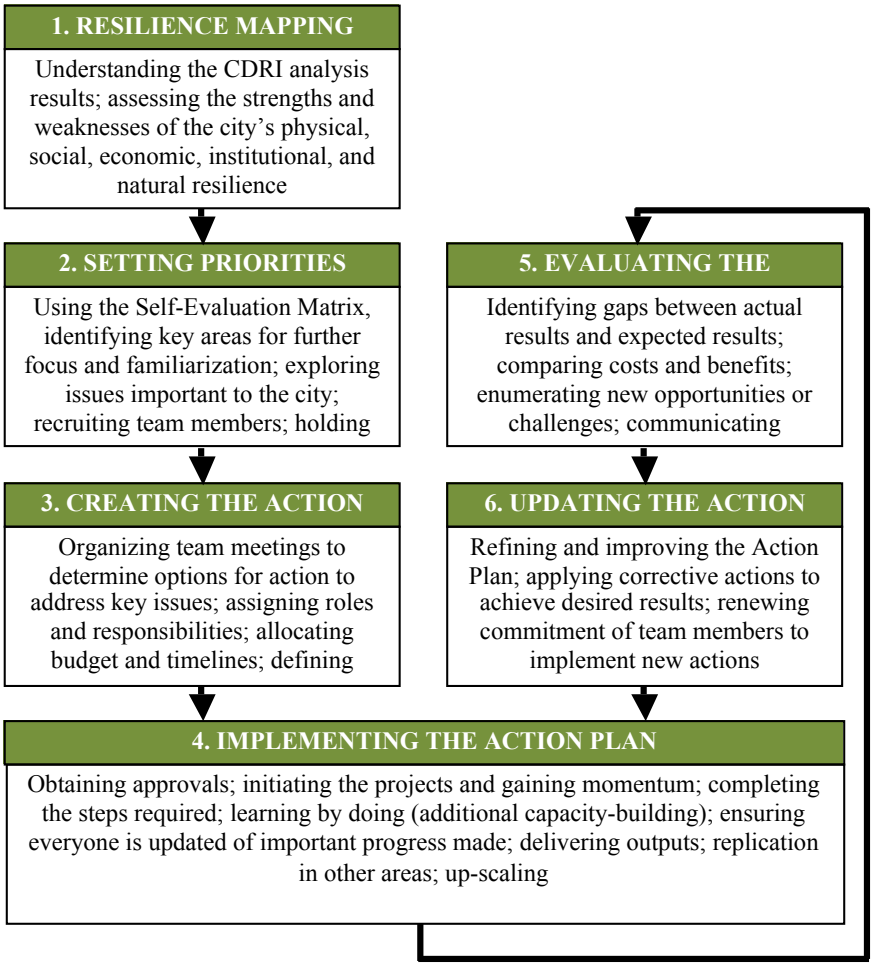

Figure 5.1 Climate Action Planning process (Fernandez *et al.* 2011)

In this study, mapping of school resilience (Step 1) has been done in Chapter 4, this part therefore will focus on the Step 2 and 3, setting the priorities as basis for creating the action plan to building educational resilience at school level. The following session will explain in more detail the step-by-step process of formulating actions, prioritizing actions, setting up the mechanism for the implementation of actions which includes assigning role and responsibilities, defining timelines, and identifying tasks for each of actions.

This study adapted the process of CAP in planning for DRR in the education sector with some modification to make it compatible with the education context as well as to fit the micro level planning (school level). A brief description of the process used in the study is as below:

- Resilience mapping: is considered as the first step whereby ***SDRA*** was used as a tool to assess the strengths and weaknesses of the education system from school level. The assessment was carried out in 218 primary schools in Hue Province and 76 primary schools in Da Nang City (Chapter 4).

- Developing EDRA: to define the set of actions based on variables of SDRA where school responses are available to building resilience at local level. In order to do this, ***focus group discussion*** was carried out with participation from provincial, district, local DoET, schools principals, and school teachers.

- Stakeholder analysis and setting up time schedule: to identify the role of each stakeholder in contribution to implement EDRA, ***stakeholder workshop*** was organized involved multi-stakeholders, whose decision or actions influence the educational resilient level at local as well as provincial level. Not stop at understanding the role of each stakeholder, the workshop also targeted to figure out the communication, relationship or cooperation among different actors. Besides, the objective of workshop at this stage is also to establish the time schedule for the implementation of EDRA in a participatory manner. Different time horizons were used to help the stakeholder categorize actions: short term (between now and the next two years), medium term (for the next two to five years), and long term (beyond) five years.

- Prioritizing: this step is important as it helps the policy makers as well as practitioners focus on the most effective actions in term of spending less resources yet bringing high efficiency and also facilitating the most potential to address the actual needs. In order to find out which actions that satisfy these conditions, the study used the two criteria: (1 actual needs of schools, which is defined by the level of importance of variables rated by the school principals; and (2) the level of variable itself contributes to the overall resilience, which is defined by the correlation between variables and the overall resilience.

- Creating the plan: developing actions, considering stakeholder, timing and prioritizing are necessary yet insufficient. Understanding the implementing mechanism at school level, which is proposed by SMB, is of tremendous important to

promote effective DRRE in practice. For this purpose, key informant interviews were carried with SMB, which focused mainly on how the actions can be operated in the actual conditions of schools. This step also allows the SMB to break down the actions into smaller tasks and then identifies the steps need to be taken for each task.

In summary, the action plan developed in this part will include the following elements: list of actions, responsibility of stakeholders, time schedule, prioritized actions, and implementing mechanism such as resources required, tasks, methods, among other.

5.3 Educational Disaster Resilience Actions (EDRA)

In order to formulate the educational resilience actions, focus group discussion with school principals, school teachers, provincial DoET and district DoET staff from Hue Province and Da Nang City were carried out (Figure 5.2). The list of actions was proposed from the discussion based on 51 variables from SDRA where interventions are available to improve the resilience. The list of SDRA variables, which includes both variables to assess the current conditions and variables to improve the resilience, is prepared as the framework for creating actions. While EDRA was developed from most of the parameters and dimensions of SDRA, it neglected the measuring aspects and focused more on the aspects to improve resiliency of education. Natural dimension together with its parameter and variables therefore is not considered in formulating the list of actions.

At first, the participants were requested to cross out the variables that used to assess the current conditions. For example, variables assess the damages by disasters on school buildings and school equipment and facilities, or variables assess the number of teachers and students affected by disasters. Other variables that measure the capacity of schools have been neglected such as percentage of educational equipment and facilities repaired or renewed after disaster, or percentage of garbage collected and dumped in proper place per day. According to Glenn et al. (2011), many actions fail because the actions appear too difficult, or exceed the capacity of school to afford. Therefore, variable examines the availability of environmental protection facilities/equipment within school (i.e. energy saving equipment, water saving

facilities, etc.) was also disregarded. In total, there are 24 variables belong to physical condition, human resource and natural dimension opted out.

In the next steps, participants were required to develop the actions based upon the variables aiming to improve the level of school resilience to disasters. For example, to improve the physical condition of schools, activities such as carry out regular check on buildings and facilities, apply building codes, set up emergency exit door and emergency shelter amongst other were proposed.

Figure 5.2 Focus group discussion with provincial and district DoET staff and school teachers

As a result of the focus group discussion, 51 variables were converted into 51 actions, which is also the framework for school-based planning for DRRE implementation. The EDRA has four dimensions, for physical condition, there are ten actions need to be addressed. There are eleven actions need to be considered below Human resource dimension and there are 15 actions for each of Institutional issue and External relationship dimensions(Table 5.1). Then Table 5.2 will provide a list of detailed actions and action ID.

Table 5.1. Number of selected variables in each of parameters

Physical condition	Number of actions	**Human resource**	Number of actions	**Institutional issue**	Number of actions	**External relationship**	Number of actions
School buildings	4	Teachers and staff	2	Planning	5	Collaboration	5
Facilities & equipment	2	Students	5	Management	5	Relationship with community	5
Hygienic and environmental condition	4	Parents/Guardians	5	Budget	5	Mobilizing fund	5

Table 5.2. List of 51 actions of EDRA developed from SDRA

	ID	Educational Disaster Resilience Actions
Physical condition	P1	Carry out regular check on buildings
	P2	Apply safety building codes
	P3	Set up emergency exit door
	P4	Set up emergency shelter within school
	P6	Carry out regular check on school facilities and equiment
	P8	Provide emergency supplies
	P11	Implement environmental protection campaigns
	P12	Carry out regular check on hazardous materials
	P13	Ensure food safety conditions in school
	P15	Establish recycle system
Human resource	H2	Provide pre-service teacher training by University of Education
	H3	Provide regular disaster training for teachers and staff in schools
	H4	Assess the level of participation of teachers in disaster activities
	H5	Share disaster preparedness plan to teachers and staff
	H8	Provide regular disaster training for students by schools
	H9	Assess the level of participation of students in disaster activities
	H10	Share disaster preparedness plan to students
	H11	Organize regular meetings PTA discuss on DRR
	H12	Provide regular training for parents
	H13	Set up school-home emergency notification system
	H14	Share disaster preparedness plan for parents
	H15	Involve parents in disaster activities
Institutional issue	I1	Incorporate DRR into school planning
	I2	Incorporate DRR into school regulation
	I3	Incorporate DRR into school syllabus
	I4	Establish disaster preparedness plan
Institutional issue	I5	Establish disaster recovery plan
	I6	Establish school early warning system
	I7	Disseminate disaster related information and materials
	I8	Implement disaster activities
	I9	Organize regular meeting of disaster group
	I10	Provide regular disaster training for disaster group
	I11	Allocate budget for DRR activities within school
	I12	Allocate budget for disaster outreach activities
	I13	Allocate budget for replacement/repair after disaster
	I14	Allocate budget for monitoring facilities /infrastructure
	I15	Allocate budget for supporting students that have special needs
External relationship	E1	Regular meetings with local DoET
	E2	Regular meetings with local Government
	E3	Establish communication system between other schools/institutions
	E4	Establish warning system from local government to school
	E5	Collaborate with local government during a disaster
	E6	Support from community to school during disaster
	E7	Improve school to be used as evacuation for communities
	E8	Participation of school in DRR activities in communities
	E9	Support from local community to school
	E10	School involve in disaster management planning of local community
	E11	Fund support from the Government specific on disaster activities
	E12	Mobilizing funds from parent-teacher association (PTA)
	E13	Mobilizing funds from local community
	E14	Mobilizing funds from other organizations, NGOs, private organizations
	E15	Shifting budget for disaster activities

5.4 Stakeholder analysis and development of time schedule

Based on the EDRA framework, the stakeholder workshop was carried out in both Thua Thien Hue Province and Da Nang City to understand the role of various stakeholders in the implementation process. The objectives of the workshop are:

- To agree upon the list of actions on how to enhance educational resilience based on the SDRA framework

- To discuss on different roles of each stakeholder in contributing to the implement of action, which includes main implementing, supporting role, and participation role based on the perceptions of participants.

- To define the time schedule for each of actions, which is defined as short-term (up to 2 years), medium term (2-5 years) and long-term (more than 5 years).

- Lastly, to establish a rostrum where stakeholders carrying out groupthink and making decision on enhancing resiliency for education sector in a participatory manner

At first, participants were grouped according to their status as teachers, students, provincial DoET staff, district DoET staff, etc. In total there are nine groups of stakeholders. Each of groups was given 30 minutes to discuss and decide their role for each of actions in stakeholder analysis matrix. The matrix provides the list of 51 actions and role of stakeholders were categorized into main implementation (marked with ◎), or supporting role (marked with△), and participation (marked with ○). After that, discussion between groups was carried out to address the over lap in placing roles, then adjust, and finalize the role of each group in a comprehensive stakeholder analysis sheet.

In the second step, participants were grouped according to their role identified in the first stage. They were requested to decide whether actions could be implemented in the short term (up to 2 years), medium term (2-5 years) or long-term (more than 5 years). The definition of short term, medium term, and long term was based on the time schedule of provincial action plan on socio-economic development. The categorization of the three is for the purpose of integration of DRRE into existing educational agenda and provincial agenda. The criterion of classification is based on:

- the actual need of school in order to carry out actions in DRRE, which aims to build school resilience;

- the availability of resources that school can afford or get support from outsources; and

- the capacity to complete the action within the defined time slot.

The classification of short term, medium term and long term will also provide practitioners a long-term vision to carry out the prioritized actions.

Workshop in Hue Province

In Hue Province, the workshop was carried out on the occasion of the "Provincial Drawing Competition Day" on 15 March 2013, which was held by Hue DoET in Le loi Primary school in Hue City. The program was full day from the morning until the afternoon. There are in total 98 students from grade 3, 4, and 5 of primary schools in nine districts ("Information about the contest on the computer drawing for primary students of the school year 2012-2013", 18 March 2013).

The stakeholder workshop utilized the lunch break time from 12am to 2pm. The participants of the workshop included staff from provincial DoET, staff from nine district DoET, teacher and students and parents from primary schools in Hue Province. Besides, representatives from local government, local community, and local health center, Hue University of Education were invited to the workshop (Figure 5.3). The total number of participants is 24 people (Table 5.3).

Table 5.3 Participants of the stakeholder workshop in Hue Province

Participants	**Number of people**	**Participants**	**Number of people**	**Participants**	**Number of people**
Provincial DoET	1	School students	5	Local health center	1
District DoET	9	Parents	3	Hue University of Education	1
School Teachers	2	Local community	1	Local government	1

Workshop in Da Nang City

Stakeholder workshop was carried out in Da Nang City during the "Primary Student Festival Day" held in 16 March 2013 by Da Nang DoET ("Da Nang: Primary Student Festival Day of the school year 2012-2013", 16 March 2013). The event had two main components: (1) the examination for excellent students in Vietnamese and Mathematics; and (2) question-and-answer contest with topics related to environmental protection, biodiversity, climate change and DRR.

The participants of the workshop in Da Nang City includes staff from provincial DoET, staff from seven district DoET, teacher and students and parents from primary schools in Da Nang City. Also, representatives from local government and local community were invited to the workshop (Figure 5.4). The number of participants is 14 people (Table 5.4)

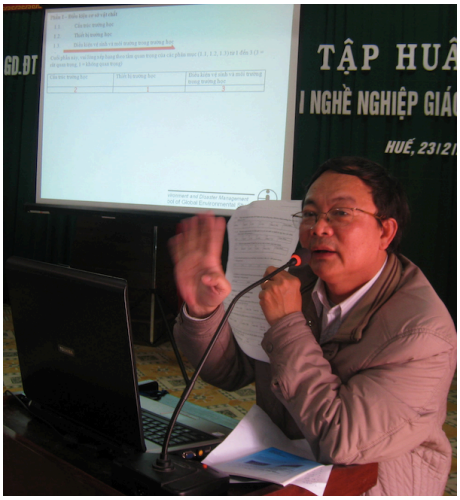

Figure 5.3 Stakeholder workshop in Hue Province

Figure 5.4 Stakeholder workshop in Da Nang City

Table 5.4 Participants of the stakeholder workshop in Da Nang City

Participants	Number of people	Participants	Number of people
Provincial DoET	1	School Teachers	1
District DoET	7	School students	2
Local government	1	Parents	1
Local community	1		

5.5 Result from stakeholder analysis

Although most of the proposed actions was targeted and lead by schools, supporting actions from community and local government, as well as others are significant (Table 5.5). The following part will examine the role of contribution of stakeholders for each of EDRA actions.

5.5.1 Role of school teachers

Results show that school teachers and staff are the key implementers and responsible for 45 out of 51 actions (Figure 5.5). For actions related to human resource and Institutional issue such as regular check for school building and facilities, incorporation DRR into school planning, develop disaster preparedness and recover

plan, schools take full responsible for all actions. Meanwhile, for actions related to physical condition and external relationship, the role of school teachers as supporters and participations are recognized. As such, the school teachers show more important role in Institutional issue, human resource and physical condition rather than in contributing to external relationship.

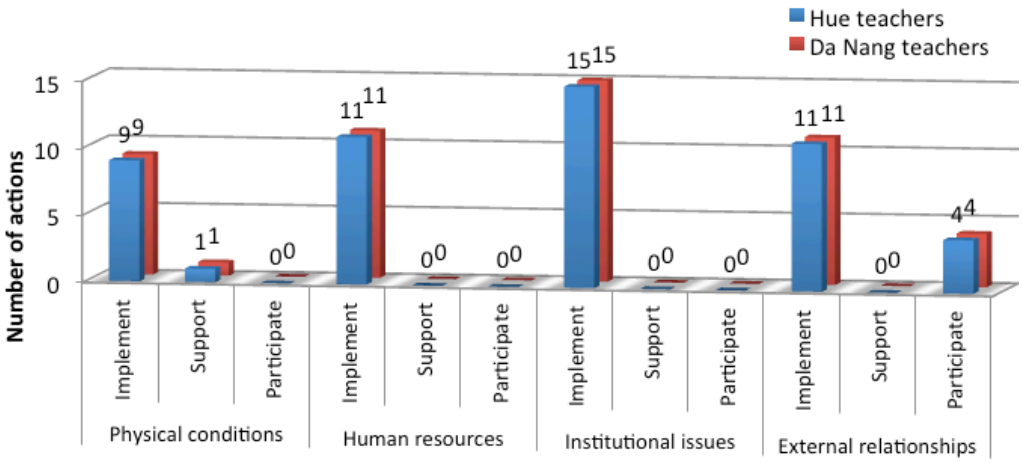

Figure 5.5 The role of school teachers in implementing EDRA

5.5.2 Role of school students

Despite the fact that students are the key stakeholder and main beneficiary of education for DRR, there is no action to be implemented by students (Figure 5.6). Compare to the role of teachers as key actors, the role of students is mainly supporting and participation. For example, for physical improvement, students focus on supporting the activities related to environmental protection such as environmental campaigns, and recycle system in schools. For students in Hue Provinces, the role of regular check on hazardous materials and support to provide emergency supplies is added. Besides, their ability to communicate with parents and mobilize parents' attention to school activities enable students to be an effective agents in supporting school teachers to share the disaster plan for parents and to involve parents in disasters activities in school. Aside from participation in disaster activities in schools such as disaster trainings, students supplement school activities by acting as a connection to promote the out-reach activities from school to communities.

According to UNICEF (2007), rapidly changing values and practices in society in Viet Nam, such as the move to a market economy, individual interests, citizen's rights, freedom, and acceptance of differences, are having a significant impact on changing children toward active participating role in both service delivery and policy

formation. However, results from the study still shows little involvement of students in disaster planning and management such as incorporate DRR into school planning, regulation, and curriculum both in Hue Province and Da Nang City. Therefore, efforts on increasing recognition of the importance of consulting children and encouraging the participation of children in the policy issues need to be higher recognized among educators and policy-makers.

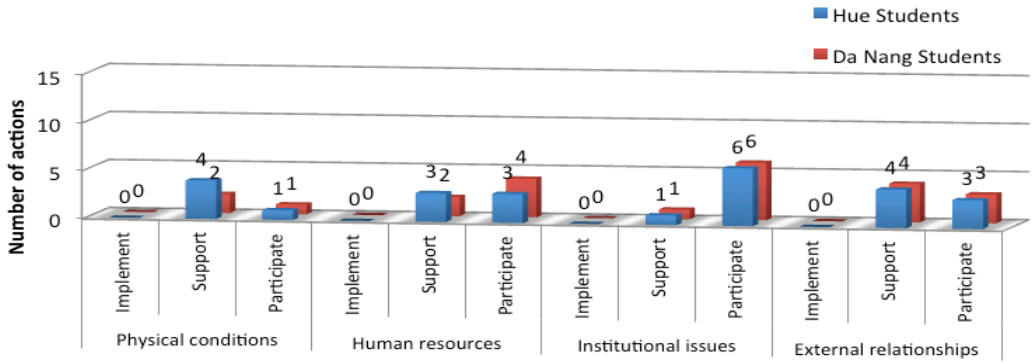

Figure 5.6 The role of students in implementing EDRA actions

5.5.3 Role of parents or guardians

The dominant role of parents in implement EDRA actions is participation. For example, parents participate in actions such as environmental campaigns, regular meeting of PTA. Especially, parents also participate in the establishment of disaster preparedness plan and disaster recovery plan (Figure 5.7). The supporting role of parents was recorded highest in external relationship, including support for the improvement of schools to be used as evacuation shelter for communities. It seems like guardians in Hue Province pay more attention to school activities in general and DRR activities in particular compare to Da Nang City. In Hue Province, parents or guardians also support school teachers in DRR training for students and help to facilitate the involvement of school in disaster management of local community.

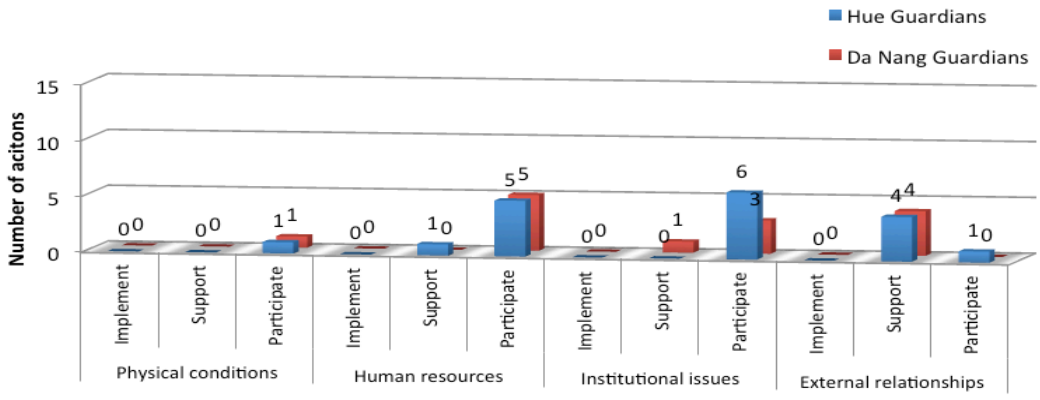

Figure 5.7 The role of parents or guardians in implementing EDRA actions

5.5.4 Role of local community

It is important to note that the preceding role of community is highlighted in one actions of giving support for schools during disasters, yet it is should not considered as little for the implementation of EDRA. Rather, community is thought to provide valuable support for actions related to physical improvement such as envrionmental campaign, establishment of disaster preparedness and recovery plan, implementation of disaster activities in school (Figure 5.8). As it is accepted that no school can or should operate in isolation from the community where it resides (UNICEF 2013), the role of community was looked through the cooperation between school and community in implementing DRRE is more essential.

There is a difference between Hue Province and Da Nang City is that local community in Hue Province also involves in Human resource related actions such as disaster training for students and parents and the establishment of early warning system in schools, yet none is mentioned in Da Nang analysis. It is noted that the supporting role of community is important for the improvement of external relationship' dimension regard to both technique and financial support.

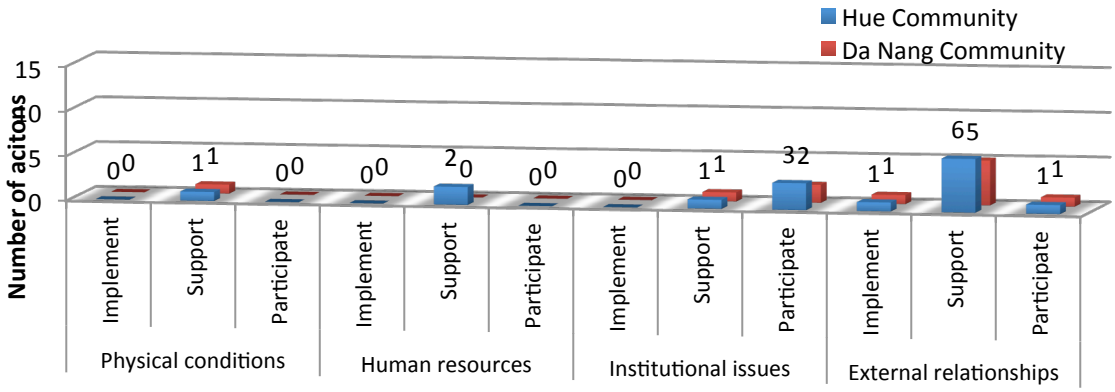

Figure 5.8 The role of local community in implementing EDRA actions

5.5.5 Role of district DoET

Result shows that schools received the most important support from district DoET both in Hue Province and Da Nang City. However, district DoET in Hue Province provides support for 65% of actions while district DoET in Da Nang City provides about 43% of the total actions in implementing EDRA (Figure 5.9). It is interesting that the role of district DoET is more important than provincial DoET both in supporting and implementing activities of DRRE at schools in Hue Province and Da

Nang City. In particular, for institutional related actions, the role of district DoET is recorded in 13 out of 15 actions, and for two third of the actions related to external relationship. Besides, district DoET acts as important agent in facilitating the relationship between school and community through supporting for early warning system from local government to school, for the collaboration between school and local government during disaster, for participation of school in local DRR planning and DRR related activities. For example, district DoET involves in the establishment of disaster preparedness and recovery plan, incorporation of DRR into school planning, school regulation, and curriculum. For Human resource dimensions, it is noted that district DoET was assigned as main actor of DRR training for teachers and staff, in cooperation with school. In general, successful management of disasters will not be possible without district DoET commitment and involvement. Supporting district DoET is therefore paramount. However, there is a lack of district DoET's role in distribution of disaster related materials and information both in Hue Province and Da Nang City.

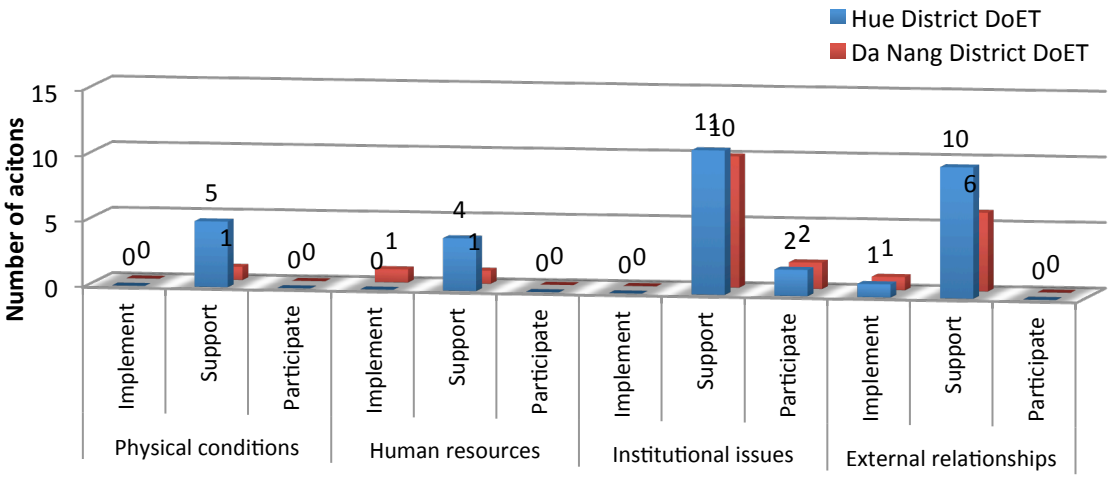

Figure 5.9 The role of District DoET in implementing EDRA actions

5.5.6 Role of provincial DoET

While district DoET give strong support for the implementation of EDRA in schools, the role of provincial DoET is hardly to be recognized both in Hue Province and Da Nang City. None of actions is considered to be implemented by provincial DoET (Figure 5.10). Surprisingly, the role of provincial DoET has not been recognized in contributing to the enhancement of physical condition and human resource in schools, unless one support has been seen for the DRR training of teacher

and staff. Provincial DoET are more involved in actions related to Institutional issue and external relationship such as establishment of disaster preparedness and recovery plan, set up of school early warning system, among other.

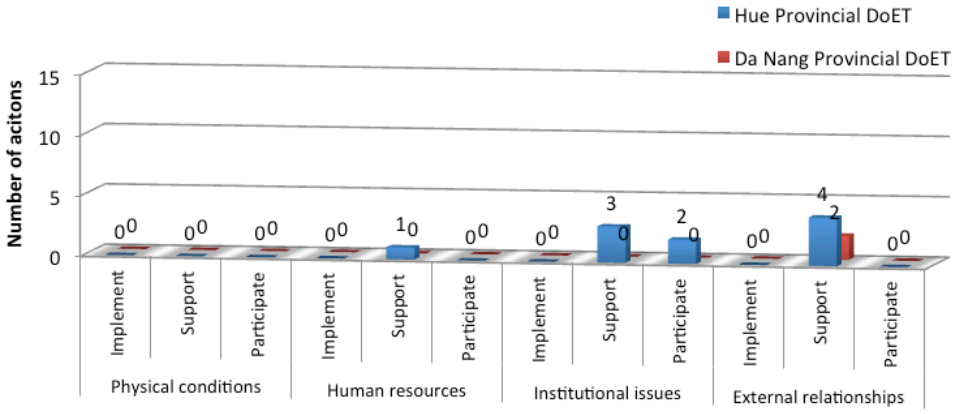

Figure 5.10 The role of Provincial DoET in implementing EDRA actions

5.5.7 Role of local government

In Hue Province, the role of local government is assigned significant for the improvement of physical condition such as applying school building safety code, supporting school in providing emergency supplies and carrying out regular check for school building (Figure 5.11). In Da Nang City, it is the responsible of school itself to carry out regular check for school buildings. In both regions, the role of local government is seen important in supporting school to response to disasters and recover after disasters. Meanwhile, few contribution of local government to the Human resource is observed, unless one support is given to the DRR training for students in schools is recorded in Hue Province. For actions related to Institutional issue such as planning for disaster preparedness and recovery, the role of local government is presented.

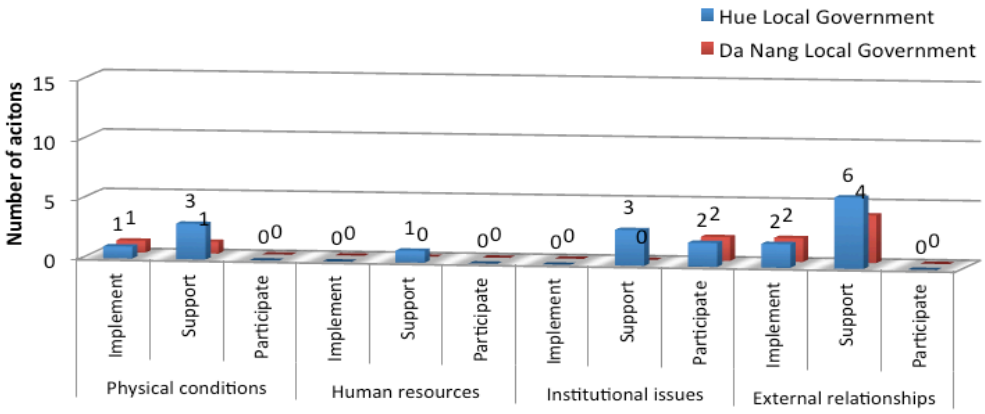

Figure 5.11 The role of local government in implementing EDRA actions

5.5.8 *Role of local health center*

In both Hue Province and Da Nang City, the role of local health center is mainly focus on the issues of food safety conditions, and activities related to health issues after disasters (Figure 5.12). In addition, in Hue Province, local health center also provides significant support for the training related to DRR issues for teachers and staff, students, and parents.

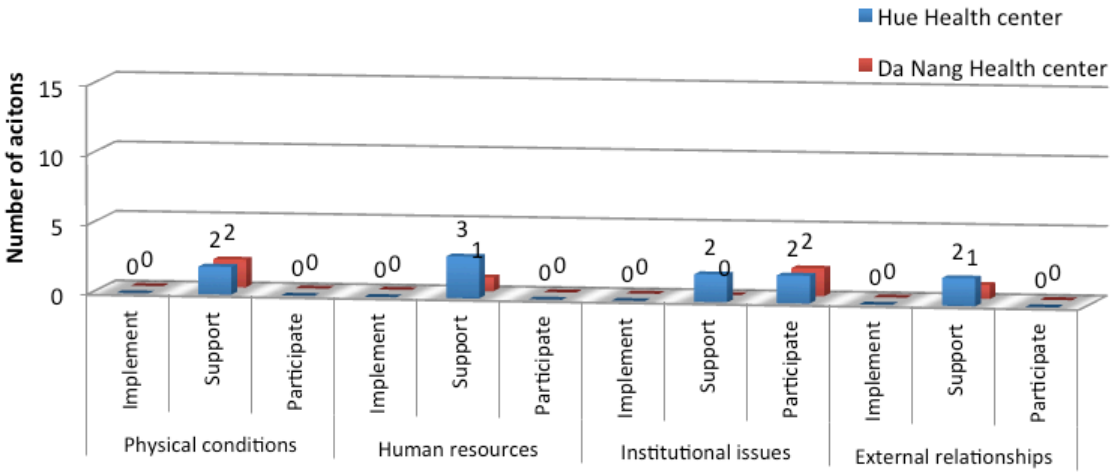

Figure 5.12 The role of local health center in implementing EDRA actions

5.5.9 *Role of academia*

The role of academia is stressed where knowledge and consultant is needed, for example, support for DRR trainings, involve in the communication network between schools and educational institutes (Figure 5.13). In particular, academia is considered as vital partner for the integration of DRR into teaching and learning activities in school, as well as for the dissemination of disaster related materials and information both in Hue Province and Da Nang City.

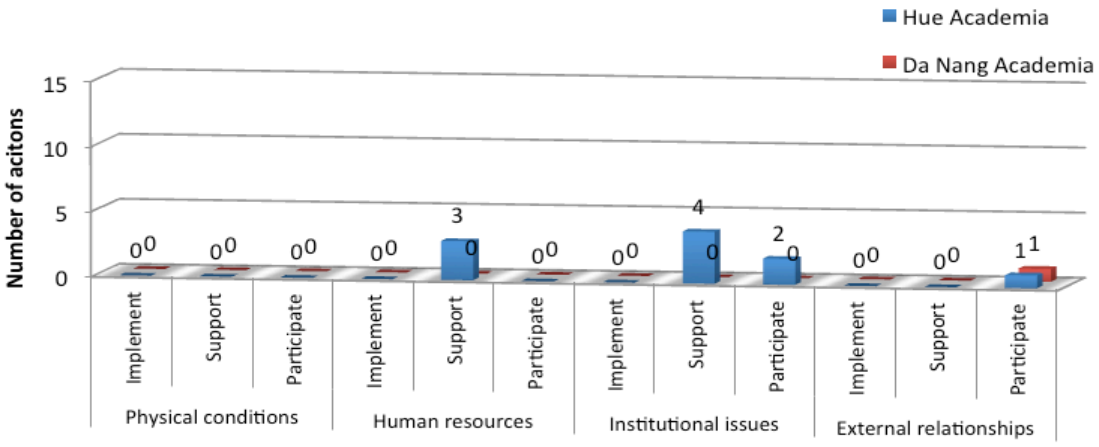

Figure 5.13 The role of academia in implementing EDRA actions

5.5.10 Role of NGOs

The role of NGOs assumes significance in view of their wider engagement in training and planning such as training for teachers and staff, for students and for disaster group in schools (Figure 5.14). Besides, financial support from NGOs is necessary for schools to carry out DRRE activities. It is interesting to note here that the role of NGOs are not only provide support but also lead the activity of DRR training for students. In the study of Shiwaku (2010), the role of NGOs can help in promoting involvement of students with community. Through specific projects on DRRE provided by NGOs, students have interest in DRR at local context. It is then advised that the role of NGOs could be in providing opportunities for students to work with community

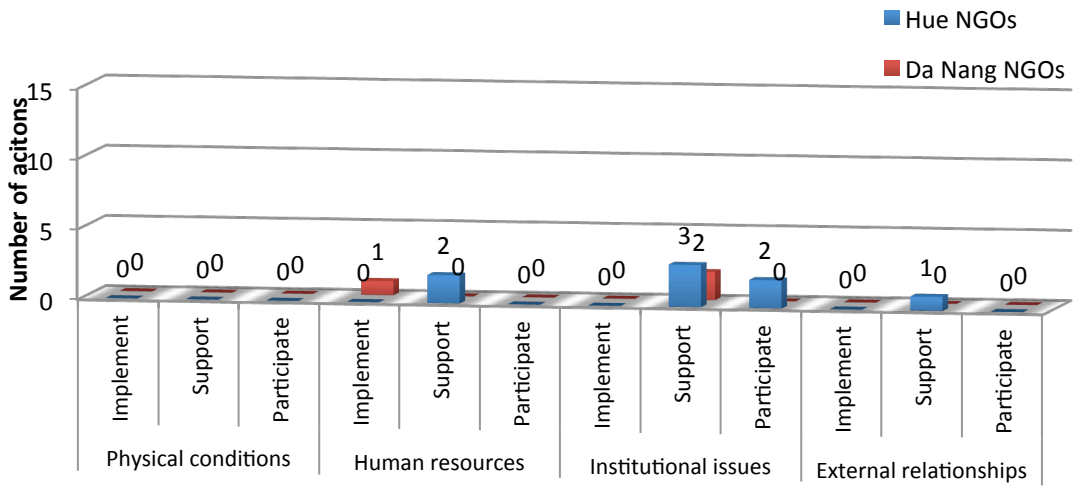

Figure 5.14 The role of NGOs in implementing EDRA actions

5.5.11 Role of other stakeholders

Other stakeholders such as private company, individuals, and civil society such as Study Encourage Society, Woman Union are stressed important in supporting the implementation of EDRA at local level. For example, private company is responsible for financial support and civil society is mainly responsible for development of external relationship related issues (Figure 5.15). In addition, supports from these stakeholders cover both technique and financial support for school to response and recover from disaster.

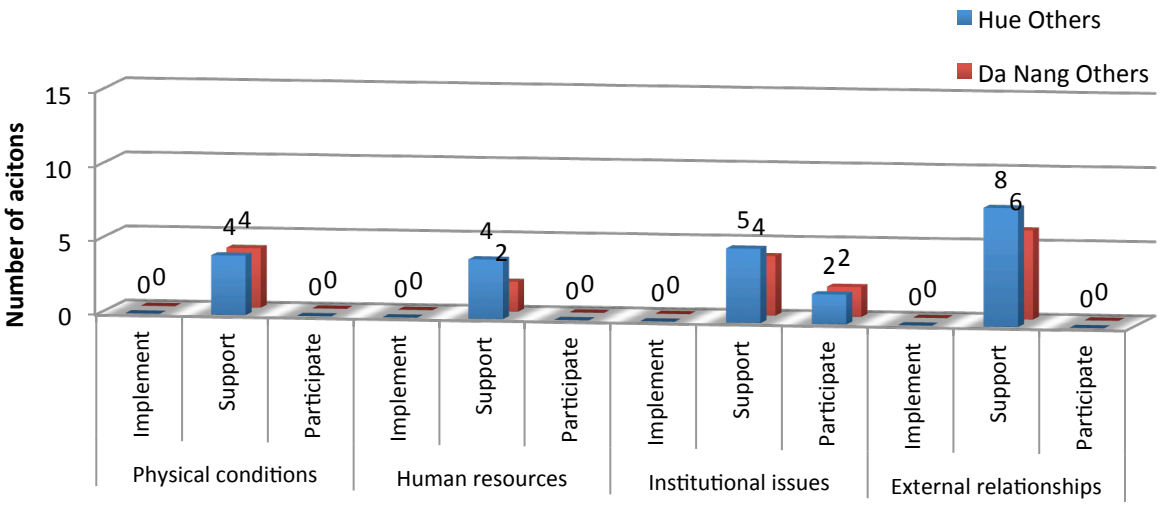

Figure 5.15 The role of other stakeholders in implementing EDRA actions

5.5.12 Cooperation mechanism among stakeholders

Results from stakeholder analysis illustrate specific roles of each stakeholders in implementing DRRE practices. The leading role of teachers in both educational governance and educational activities has been emphasized in the analysis. For educational governance activities, teachers collaborate with district DoET and local government in planning for natural disasters, to receive timely early warning, to response properly to disaster, as well as to recovery quickly after disaster. Teacher has also the ability to play leadership role and influencing policy makers, practitioners, and the public from school level. For educational activities, it is not important for teachers to be expert on DRR and transfer knowledge for student, but rather, teacher should be "change agent", to connect student with community and build a safer community. The leading role of teachers is effective only when connection between school students and community are in place. In this way, teachers can contribute largely to build students' resilience.

While the role of teachers was emphasized as leader in most of the actions, the role of school students is vague and invisible, as merely focus on supporting some actions in schools. Students should recognize their role in the DRRE as not only perceive the knowledge from teachers but also reflex their understanding throuh acting in response to disaster, as well as to interact with community and contribute as a part of community effort in DRR. For example, student support schools in checking school facilities and promoting outreach activities to community. It is also important

for students to understand the vulnerable people in their local areas. If a school could raise such students, the community can be resilience to disasters (Cabasal 2010).

According to Shiwaku (2007) in order to promote disaster education, cooperation between local community, NGOs and government are significant. However, in this study yet insufficient in the context of Viet Nam. Analysis in this study shows that collaboration among the three are insufficient in the context of Viet Nam. The most essensial supporting roles in case of Hue Province and Da Nang City are from district DoET and local government. Meanwhile, the role of provincial DoET is only seen through the support related to direction or policy intervention. The DoET at provincial level also plays important role to facilitate the process that integrate DRRE into educational strategic development plan and the overall socio-economic development plan. It is the role of provincial DoET to put in place the legislation and administrative arrangements for action plan on DRRE to be taken in effects at local level.

Organizations such as local health center, academia and NGOs focused on consulting and collaborating as required. The role of scientific community should focus on forming package of knowledge in a way that satisfy the understanding of policy makers on DRRE issues, as the same time can be easily used to formulate proper policy. Phong (2009) has suggested that political feasibility should be considered as part of the knowledge development and dissemination process in order to facilitate the implementation of a policy. In Viet Nam, NGOs also have influenced government policies and institutional arrangements for disaster risk management. By introducing new processes and technologies, integrating local communities into the decision making process and requiring the inclusion of comprehensive disaster risk reduction action in development processes, these agencies can impact government policies.

While community contribute to DRRE in school, the implementation of DRRE also have opportunity to enable different stakeholders in community and help to facilitate community based disaster management project. In this way, schools will be able to create a social context that involve the active role of teachers and students in community activities (Bonifacio 2010). School DRRE is therefore not only considered as the interactive activities between teachers and students but also as opportunities of learning among teachers and students with community and of communication among them.

Table 5.5. Stakeholder analysis in Hue Province and Da Nang City

		Teachers	Students	Guardians	Community	District DoET	Local Government	Local health center	Provincial DoET	Academia	NGOs	Others
Physical condition	P1	◎				△	△					
	P2	△				△	◎					
	P3	◎				△	△					
	P4	◎										△
	P6	◎	△									
	P8	◎	△			△	△					△
	P11	◎	○	○	△	△						△
	P12	◎	△									
	P13	◎						△				△
	P15	◎	△					△				
Human resource	H3	◎				◎/△		△	△	△	△	△
	H4	◎				△						
	H5	◎										
	H8	◎	○	△	△	△	△	△		△	◎/△	△
	H9	◎	△/○									
	H10	◎	○									
	H11	◎		○								
	H12	◎		○	△	△		△		△		△
	H13	◎	○	○								
	H14	◎	△	○								
	H15	◎	△	○								△
	I1	◎				△						
	I2	◎				△						
	I3	◎				△				△		△
	I4	◎	○	○	○	○	○	○	○	○	○	○
	I5	◎	○	○	○	○	○	○	○	○	○	○
	I6	◎	△		△	△	△		△			△
	I7	◎	○	○						△	△	△

		Teachers	Students	Guardians	Community	District DoET	Local Government	Local health center	Provincial DoET	Academia	NGOs	Others
Institutional issue	I8	◎	○/△	○/△	○	△	△	△	△	△	△	△
	I9	◎	○	○								
	I10	◎	○	○		△	△	△	△	△	△	△
	I11	◎				△						
	I12	◎				△						
	I13	◎				△						
	I14	◎				△						
	I15	◎				△						
External relationship	E1	○				◎						
	E2	○					◎					
	E3	◎				△				○		△
	E4	○	○	△	△	△	◎		△			△
	E5	◎				△	△					△
	E6	○	○	△	◎	△	△	△	△			
	E7	◎	△	△	△	△	△	△	△			△
	E8	◎	○	○	△	△						△
	E9	◎			△	△	△					△
	E10	◎	○		○	△						△
	E11	◎					△					
	E12	◎	△	△								
	E13	◎	△		△							
	E14	◎	△		△	△	△		△		△	△
	E15	◎				△						

◎ Main implementer
△ Supporter
○ Participation

Same between Hue and Da Nang
Different
Actions only available in Hue
No actions available

5.6 Result of time schedule development

The main purpose of defining time schedule for each of actions is to define which actions will be implemented first and which will be carried out later based on the actual needs and the availability of resources. Results show that there are 42 out of 51 actions in Hue Province and 49 out of 51 in Da Nang are considered to implement within two years. Actions related to training on DRR and allocating budget for DRR activities are categorized in medium term, or to be implemented in the next two to five years (Table 5.6).

For physical dimension, actions such as carrying out regular check for school buildings and facilities, setting up emergency shelter in schools, providing emergency supplies, implementing environmental campaigns, and ensuring food safety in school will be able to complete within 2 years. The result from SDRA showed that most of the urban schools in both Hue Province and Da Nang City have high score in these actions, yet it takes time for the rural schools, especially in Hue Province to improve the situation. In Da Nang City, all actions related to physical condition will be able to complete within two years. For Hue Province, actions such as applying building safety code, setting up emergency exit door, and setting up recycle system in school were included in medium-term horizon as not all schools will have enough means to accomplish these actions within a short time.

For human resource, short-term actions in Hue Province and Da Nang City were defined as assessing the level of participation of teachers and students, sharing the school disaster plan for teachers, staff, students and parents, organizing regular meeting of PTA, setting up school-home notification system, and establishing mechanism to involve parents into DRR related activities in school. Meanwhile, actions related to provide DRR training are categorized in medium term horizon. It is interesting to note that, in Da Nang, training for teachers and staff will be able to implement within 2 years, and training for parents within 2 to 5 years while Hue Province categorized the training for parents in long-term horizon which will be implemented after 5 to 10 years. The findings also show a lack of capacity and irrelevant support from stakeholders on disaster training activities.

Table 5.6. Time frame for EDRA of schools in Hue Province and Da Nang City

			Hue Province			Da Nang City		
		ACTIONS	Short (<2yrs)	Medium (2-5yrs)	Long (>5yrs)	Short (<2yrs)	Medium (2-5yrs)	Long (>5yrs)
Physical condition	P1	Carry out regular check on buildings	✓			✓		
	P2	Apply safety building codes		✓		✓		
	P3	Set up emergency exit door		✓		✓		
	P4	Set up emergency shelter within school	✓			✓		
	P6	Carry out regular check on school facilities and equiment	✓			✓		
	P8	Provide emergency supplies	✓			✓		
	P11	Implement environmental protection campaigns	✓			✓		
	P12	Carry out regular check on hazardous materials	✓			✓		
	P13	Ensure food safety conditions in school	✓			✓		
	P15	Establish recycle system		✓		✓		
Human resource	H3	Provide regular disaster training for teachers and staff in schools		✓		✓		
	H4	Assess the level of participation of teachers in disaster activities	✓			✓		
	H5	Share disaster preparedness plan to teachers and staff	✓			✓		
	H8	Provide regular disaster training for students by schools		✓			✓	
	H9	Assess the level of participation of students in disaster activities	✓			✓		
	H10	Share disaster preparedness plan to students	✓			✓		
	H11	Organize regular meetings PTA discuss on DRR	✓			✓		
	H12	Provide regular training for parents			✓		✓	
	H13	Set up school-home emergency notification system	✓			✓		
	H14	Share disaster preparedness plan for parents	✓			✓		
	H15	Involve parents in disaster activities	✓			✓		
	I1	Incorporate DRR into school planning	✓			✓		
	I2	Incorporate DRR into school regulation	✓			✓		
Institutional issue	I3	Incorporate DRR into school syllabus	✓			✓		
	I4	Establish disaster preparedness plan	✓			✓		
	I5	Establish disaster recovery plan	✓			✓		
	I6	Establish school early warning system	✓			✓		

	I7	Disseminate disaster related information and materials	✓			✓		
	I8	Implement disaster activities	✓			✓		
	I9	Organize regular meeting of disaster group	✓			✓		
	I10	Provide regular disaster training for disaster group		✓		✓		
	I11	Allocate budget for DRR activities within school	✓			✓		
	I12	Allocate budget for disaster outreach activities		✓			✓	
	I13	Allocate budget for replacement/repair after disaster	✓				✓	
	I14	Allocate budget for monitoring facilities /infrastructure	✓				✓	
	I15	Allocate budget for supporting students that have special needs	✓			✓		
	E1	Regular meetings with local DoET	✓			✓		
	E2	Regular meetings with local Government	✓			✓		
	E3	Establish communication system between other schools/institutions	✓			✓		
	E4	Establish warning system from local government to school	✓			✓		
	E5	Collaborate with local government during a disaster	✓			✓		
	E6	Support from community to school during disaster	✓			✓		
	E7	Improve school to be used as evacuation for communities		✓		✓		
	E8	Participation of school in DRR activities in communities	✓			✓		
	E9	Support from local community to school	✓			✓		
External relationship	E10	School involve in disaster management planning of local community	✓			✓		
	E11	Fund support from the Government specific on disaster activities	✓			✓		
	E12	Mobilizing funds from parent-teacher association (PTA)	✓			✓		
	E13	Mobilizing funds from local community	✓			✓		
	E14	Mobilizing funds from other organizations, NGOs, private organizations	✓			✓		
	E15	Shifting budget for disaster activities	✓			✓		

For Institutional issue, actions related to planning for disaster and organizing disaster activities such as incorporating DRR into school plan/school regulation/school curriculum, developing disaster preparedness and recovery, establishing school early warning system disseminate disaster related information and materials were placed in short-term horizon, However, actions related to allocating budget for DRR activities were classified in medium term. Especially in Da Nang City, allocate budget for disaster outreach activities, for replacement/repair after disaster, and for monitoring facilities /infrastructure were defined as medium term actions. This highlights the contradiction between the expectation of school teachers to implement DRR activities and the high competition of financial resources for other actions rather than DRR activities in school.

Compare to the three dimensions above, the actions related to external relationship are stressed important and needed to be achieved within 2 years, unless on action aim to improve schools to be used as community evacuation in Hue Province.

5.7 Action prioritization

In order to rank 51 actions in term of its effectiveness in to advance the level of resilience, the study considers both perception of school principals in weighting the importance of actions and the contribution of each action toward the overall resilience. Accordingly, there are two selected criteria (1) importance attributes (defined by the level of importance of variables rated by the principals) and (2) contribution attributes (defined by the correlation coefficient between variables and the overall resilience). In the questionnaire of SDRA, for each of dimensions, school principals were requested to weight the importance of one variable against each other. Thus the important attribute was the average of the same weight of variable for all the school. The correlation between each variable and over resilience will be calculated using the Pearson correlation coefficient formulation (Chapter 4).

There is possibility that some actions perform well in consider to the importance attributes and others perform well in consider to the contribution attributes. Therefore, in order to select the actions in terms of its necessity and efficiency for building school resilience, it was assumed that the weights of importance and contribution attributes are equal, and the higher is the better. Besides, the average score of each

variable is considered as the third criteria to decide the level of priority aside from the two criteria above. This help to ensure the foci of actions on the weakness identified by the schools.

5.7.1 Result of EDRA prioritization

As a result of the screening process, 51 proposed actions were categorized from high to low in term of its necessity to schools, importance ranked by schools and contribution to the overall resilience. Higher weight means more important, higher correlation rate means higher contribution and lower score mean greater requisite. Figure 5.16 shows the top 20 prioritized actions by dimensions in urban and rural areas in Hue Province and Da Nang City.

In Da Nang City, urban schools have the highest prioritization focuses on physical condition, and external relationship related actions. In contrast, rural schools in Da Nang City have more actions categorized in the Institutional issue and the human resource. The number of actions to improve the physical condition is the less among four dimensions and also the lowest among four regions.

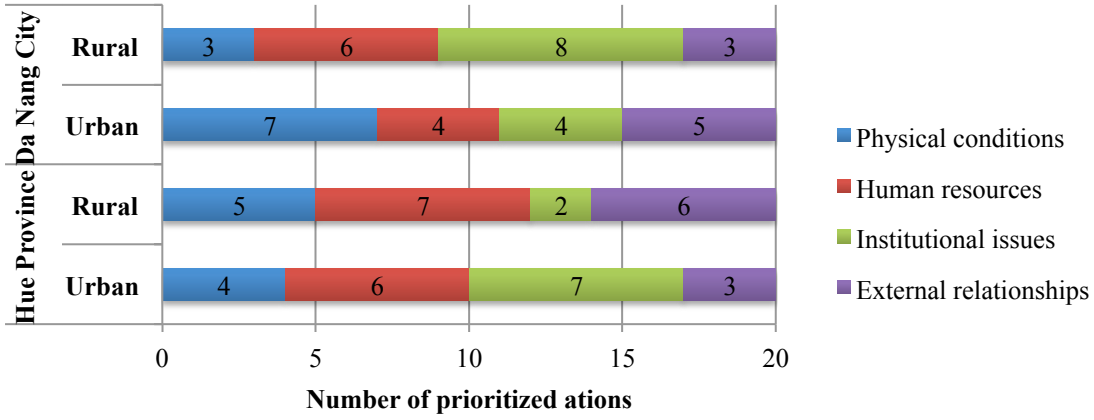

Figure 5.16 The top 20 prioritized actions by dimensions in urban and rural areas in Hue Province and Da Nang City

Table 5.7 shows the mapping of the top 20 priorities, which needed to be addressed in order to achieve resiliency for schools in urban and rural areas in Hue Province and Da Nang City. There are nine actions which were prioritized the same for both urban and rural in Hue Province, for example, provide regular training for students and teachers in school, set up emergency exit door, share the disaster plan with parents, involve parents into school activities, collaboration with local

government and participate in DRR activities held by local community. Of these nine actions, fives are aiming to improve the Human resource dimensions. This has implication to the development of educational strategy, which is focused more on development of human resource in Hue Province. Concurrently, Da Nang City focus more on strengthening the Institutional issue, for example incorporate DRR into school planning, establish school early warning system and dissemination of disaster related materials and information.

5.8 Understanding schools' perception in practicing prioritized actions

The next step of research is to understand how the School Management Board (SMB) perceives different actions can be implemented in practice. Key informant interviews with SMB of schools were carried out in four different regions of urban and rural in Hue Province and Da Nang City. Four schools that have highest score of resilience in four regions have been chosen. It is noted that out of 51 actions, 5 actions are not implemented by schools, for example, action of applying safety building codes for schools (P2) was defined as local government's responsibility, action of supporting from community to schools (E6) was thought to be as part of community role. The list of top 20 prioritized actions, which are carried out by schools, will be provided as in Table 5.8. This is considered as framework for the development of implementation mechanism. The discussion will then based on how schools take up the actions and propose the tasks to bring the actions into practice.

Table 5.7 Mapping of the top 20 prioritized actions in urban and rural schools in Hue Province and Da Nang City

Dimensions	ID	Actions	Hue Province		Da Nang City	
			Urban	Rural	Urban	Rural
Physical condition	P1	Carry out regular check on buildings				
	P3	Set up emergency exit door				
	P6	Carry out regular check on school facilities and equiment				
	P8	Provide emergency supplies				
	P11	Implement environmental protection campaigns				
	P12	Carry out regular check on hazardous materials				
	P13	Ensure food safety conditions in school				
	P15	Establish recycle system				
Human resource	H3	Provide regular disaster training for teachers and staff in schools				

Dimensions	ID	Actions	Hue Province		Da Nang City	
			Urban	Rural	Urban	Rural
	H4	Assess the level of participation of teachers in disaster activities	■			■
	H5	Share disaster preparedness plan to teachers and staff		■	■	■
	H8	Provide regular disaster training for students by schools	■	■		■
	H9	Assess the level of participation of students in disaster activities	■	■		■
	H10	Share disaster preparedness plan to students		■	■	
	H12	Provide regular training for parents	■			
	H13	Set up school-home emergency notification system		■	■	
	H14	Share disaster preparedness plan for parents	■	■	■	
	H15	Involve parents in disaster activities	■	■	■	■
Institutional issue	I1	Incorporate DRR into school planning	■		■	■
	I2	Incorporate DRR into school regulation		■		
	I3	Incorporate DRR into school syllabus		■	■	
	I4	Establish disaster preparedness plan				■
	I5	Establish disaster recovery plan	■		■	
	I6	Establish school early warning system	■		■	■
	I7	Disseminate disaster related information and materials	■		■	■
	I8	Implement disaster activities				■
	I10	Provide regular disaster training for disaster group	■	■		■
	I11	Allocate budget for DRR activities within school	■			
	I12	Allocate budget for disaster outreach activities	■			
	I13	Allocate budget for replacement/repair after disaster				■
	I14	Allocate budget for monitoring facilities /infrastructure				■
	I15	Allocate budget for supporting students that have special needs				■
External relationship	E3	Establish communication system between other schools/institutions		■		■
	E5	Collaborate with local government during a disaster	■	■	■	
	E7	Improve school to be used as evacuation for communities		■	■	
	E8	Participation of school in DRR activities in communities	■	■	■	
	E10	School involve in disaster management planning of local community				■
	E12	Mobilizing funds from parent-teacher association (PTA)	■			
	E15	Shifting budget for disaster activities			■	

Table 5.8 Top twenty priorities of four schools in four different regions of urban and rural in Hue Province and Da Nang City

	Hue Province		**Da Nang City**			**Hue Province**		**Da Nang City**	
	Urban	Rural	Urban	Rural		Urban	Rural	Urban	Rural
Physical condition			P1	P1	Institutional issue	I1		I1	I1
	P3	P3					I2		
	P6		P6				I3	I3	
		P8	P8	P8					I4
		P11	P11			I5			
		P12	P12			I6		I6	I6
		P13	P13			I7		I7	I7
	P15			P15					I8
Human resource	H3	H3	H3	H3		I10	I10		I10
	H4			H4		I11			
		H5	H5	H5		I12			
	H8	H8		H8					I13
	H9	H9		H9					I14
		H10	H10						I15
	H12				External relationship		E3		E3
		H13	H13			E5	E5	E5	
	H14	H14	H14				E7	E7	
	H15	H15	H15	H15		E8	E8	E8	
									E10
						E12			
								E15	

5.8.1 Result of key informant interview

At first, four schools in different regions of urban and rural of Hue Province and Da Nang City, which have the highest resilience score assessed by SDRA survey, were selected. Key information interviews with SMB of selected schools were carried out aiming to understand how schools perceive the selected actions and their proposal solutions to implement those actions in practices. The result of key information interviews in four schools of are synthesized and presented in Table 5.9. Findings from this will provide an important insight to the actual implementation of the actions and potential challenges when bringing DRRE in practices.

School 1: An Cuu primary school

For each of actions, a number of specific tasks based on the local condition and the actual capacity of An Cuu primary schools were proposed. For example, in order to improve the external relationship for schools, the principals suggested the task such as put priority to the participation of school in DRR activities held by community, set up the school activities to mobilize support from parents, and attend all the meeting held by local government to get information update about DRR related issues and also to strengthen the relationship between schools and local government. Besides, school strategy is to encourage the support from outsources, for example, to complete the action I7 (disseminate disaster materials and related information), it is suggested to encourage the support from other organizations to supply materials related to DRR.

- Location: in Hue City, Hue Province
- Categorized regions: urban plain areas
- SDRA profile

P	H	I	E	N	SDRA
4.56	4.38	4.52	4.50	3.48	4.29

Figure 5.17 Interview with SMB of An Cuu primary school in Hue Province

School 2: So 1 Quang An primary school

As can be seen from the proposed tasks that school stress on the importance of cooperation with local government and local DoET. Example can be seen at action P13 (to ensure the food safety conditions), school defined the tasks to cooperated with local government and local health center to give direction the school teacher sand students in ensuring the food safety conditions. Another examples are actions H3, H8, I10 and E7 (provide training for school teachers, students and guardians, and to improve school to be evacuation shelter for communities), with the tasks will be implemented in strong cooperation with local government and local DoET.

- Location: Quang Dien, Hue Province
- Categorized regions: rural coastal areas
- SDRA profile

P	H	I	E	N	SDRA
4.29	4.44	4.46	4.41	1.59	3.84

Figure 5.18 School principals show the level of the flood in 2010

School 3: Nguyen Binh Khiem primary school

While the two above stressed on the importance of supports from outsources, Nguyen Binh Khiem primary school has highlighted the role of teachers and students in their strategic tasks. Take P6 as an example, school noted that it is also the responsibility of student (at grade 5) to cooperate with teacher to carry out assessment for school facilities and equipment. In order to incorporate DRR into school curriculum, school proposed that teacher should decide themselves the content and level to integrate DRR into the teaching and learning activities in accordance with the directions from DoET.

- Location: Thanh Khe, Da Nang City
- Categorized regions: urban coastal areas
- SDRA profile

P	H	I	E	N	SDRA
4.46	4.62	4.18	3.34	3.72	4.06

Figure 5.19 Interview with SMB of Nguyen Binh Khiem primary school

School 4: Hoa Khuong 2 primary school

As can be assumed from the tasks proposed from the school principals that the school focus more on strengthening the internal capacity such as human resource and Institutional issue. For example,

Although actions related to external relationship are not many, but as can be seen through out the strategy of school that the cooperation with stakeholders are mentioned for most of the tasks. Examples are P1, to cooperate with local government, local DoET, and experts o carrying assessment for school building, and for I 15(allocate budget for supporting students with special needs), school tends to consult with Study Encourage Society, Woman Union to set up a fund for supporting student with special needs and difficulties. It is interesting to note here that for the action H8 (provide training for students), schools proposed that it should be the responsibility to decide the teaching plan, the content and the approach for the integration and should not be set up as national standard and applied for the whole education system.

Figure 5.20 Hoa Khuong primary school

- Location: Hoa Vang, Da Nang City
- Categorized regions: rural mountainous areas
- SDRA profile

P	H	I	E	N	SDRA
4.30	4.50	4.39	3.71	2.48	3.88

Table 5.9 Proposed implementation of the top 20 prioritized actions by SMB of four selected primary schools in Hue Province and Da Nang City

			Hue Province		Da Nang City	
	ID	Actions	Urban	Rural	Urban	Rural
Physical condition	**P1**	**Carry out regular check on buildings**			Design the set of indicators which can be used to assess the safety conditions of school	- Cooperate with local government, Local DoET and experts/NGOs, local community to carry out regular check. It is important that these organizations have also to include the regular check of schools building into their plan to sustain the activity.
	P3	**Set up emergency exit door**	Define the evacuation route and based on that to define which door is for emergency exit.	As school have only one stair and one gate for the whole building. It is necessary to define on the school map where should be the emergency exit door then planning to build it in the next AY		
	P6	**Carry out regular check on school facilities and equipment**	Design the set of indicators, which can be used to assess the conditions of facilities and equipment. This needs to be carried out 2 times per year.		Design the set of indicators, which can be used to assess the conditions of facilities and equipment. It is the role of student (5^{th} grade) to cooperate with schoolteacher in carrying out the action. Integrate this activity into the after class activities	
	P8	**Provide emergency supplies**		- To encourage the support from NGOs and others	- To provide the emergency supplies in the beginning of the school year	- To assess the actual needs on emergency supplies. To define what are available and what is lack of. Planning for the supplying of emergencies supplies every year
	P11	**Implement environmental protection campaigns**		- To raise awareness of school on environmental protection during the school meeting on Monday	- to integrate into the school extra-curriculum activities	
	P12	**Carry out regular check on hazardous materials**		- To set up a separated place to stock hazardous materials. The place should be located in the second floor so that it will not be affected by flood	- To check and arrange the hazardous materials	
	P13	**Ensure food safety conditions in school**		- To cooperate with local government and local health center to guide the school students and teacher in ensure food safety condition and prevent outbreak of disease especially water related disease after disaster occurs	- To cooperate with local government and local health center to guide the school students and teacher in ensure food safety condition and prevent outbreak of disease especially water related disease after disaster occurs	
	P15	**Establish recycle system**	- Set up a system in the school library to collect used books, notebooks and other stationery			- Encourage student to recycle the used notebook, pen, etc. And integrate into class of manual craft

Human resource	**H3**	**Provide regular disaster training for teachers and staff in schools**	- To assess the teachers' demand on DRR training for teachers. Planning and allocate budget for the training activities.	- To encourage support from NGOs, local DoET, provincial DoET, academia, etc. on training for teachers and staff about DRR	- To cooperate with local DoET, NGOs, academia to organize training for teachers and staff	- To cooperate with local DoET, NGOs, academia to organize training for teachers and staff
	H4	**Assess the level of participation of teachers in disaster activities**	- To develop the criteria for assessment and set up planning for the evaluation of teacher participation at the end of school year			- Teachers together with school principals develop the set of criteria for the assessment. Then consulted with local DoET staff
	H5	**Share disaster preparedness plan to teachers and staff**		- Inform about the disaster preparedness plan in the school meeting at the beginning of the disaster season	- Inform about the disaster preparedness plan in the school meeting at the beginning of the school year	- Inform about the disaster preparedness plan in the school meeting at the beginning of the school year
	H8	**Provide regular disaster training for students by schools**	- To assess the students' demand on DRR training for students. Planning and allocate budget for the training activities.	- To encourage support from NGOs, local DoET, provincial DoET, academia, etc. on training for students about DRR		- It is the responsibility of teachers to develop the plan for disaster training for students, either integrate into curriculum or extra-curriculum - To cooperate with local DoET, NGOs, academia, etc. to organize training for students
	H9	**Assess the level of participation of students in disaster activities**	- To develop the criteria for assessment and set up planning for the evaluation of student participation every semester	- To develop the criteria for assessment and set up planning for the evaluation of student participation every semester		- Teachers together with school principals develop the set of criteria for the assessment. Then consulted with local DoET staff
	H10	**Share disaster preparedness plan to students**		- Sharing and inform student about the DRR plan during the school meeting on Monday	- It is the teachers' responsibility to inform and explain about DRR activities including the role of students, family, community,.. Teachers manage themselves the timing to share. One option is during the collective period.	
	H12	**Provide regular training for parents**	- Planning and allocate budget for the training activities. - To encourage fund from outsources such as NGOs, private sectors, …			
	H13	**Set up school-home emergency notification system**		- There exist the school-home notification, thus it is important to upgrade the system and carry out it more frequently	- Update the information and contact of parents and guardians to timely inform incase of emergency	
	H14	**Share disaster preparedness plan for parents**	- Sharing and explaining the role of parents in time of disaster during the PTA meeting	- Sharing and explaining the role of parents in time of disaster during the PTA meeting	- Sharing and explaining the role of parents in time of disaster during the PTA meeting	
	H15	**Involve parents in disaster activities**	- Define and planning for activities in school to encourage more involvement of parents	- Using students as an effective channel to communicate and encourage more involvement of parents	- Organize DRR activities on Sunday so that parents will be able to attend	- Involve parents in the DRR planning process and include more activities with participation of parents
ional	**I1**	**Incorporate DRR into school planning**	- Select and integrate DRR activities in to the development of school plan at the beginning of school year		- SMB is responsible for developing the DRR plan in according with the local DRR plan and DoET direction	- Based on the provincial DRR plan and direction of local DoET to planning for DRR with participation of school teachers, staff, students and parents

	I2	**Incorporate DRR into school regulation**		- To revise and add more items related to DRR, especially the items to ensure the protection of school buildings, school facilities and equipment		
	I3	**Incorporate DRR into school syllabus**		- Consult with local DoET and provide training for teacher so that they can integrate the DRR into their teaching plan	- Follow the direction from DoET to integrate the DRR into teaching and learning activities	
	I4	**Establish disaster preparedness plan**				- Consult with local community and DOET to develop the plan to response to disasters with the defined role of SMB, teachers, staff, student at the beginning of the school year and submit to DoET
	I5	**Establish disaster recovery plan**	- Develop the plan with defined role of school teacher, staff, students in contributing to the effort of recovery in schools			
	I6	**Establish school early warning system**	- To planning for improvement of the facilities and equipment to have better information and communication with local government, local DoET		- Set up the system to keep students and teachers update about the information related to DRR such as computer and access to internet	- To develop the early warning system in school through school disaster calendar, list of emergency contact
	I7	**Disseminate disaster related information and materials**	- Encourage the support from outsources to supply materials related to DRR		- Planning for upgrade the e-library so that student can access internet and update the materials related to DRR	- Exchange the information with different primary and secondary schools, especially schools have experience with education for DRR
	I8	**Implement disaster activities**				- SMD directs school teachers to decide the DRR related activities and planning for implementation at the beginning of the year
	I10	**Provide regular disaster training for disaster group**	- Define the pioneer role of the disaster group in response to disaster and encourage the support from outsources to provide training for disaster group - Provide enough information and materials for disaster group to be active	- Planning for DRR training to disaster group in school with support from local DoET and local government		- Set up a Disaster group in school which is led by SMB and mainly responsible for response to disaster - Set up a fund for the activities of the Disaster group - Consult with local Red Cross on planning for DRR training for the group
	I11	**Allocate budget for DRR activities within school**	- Develop the annual financial management plan which consider the budget for DRR activities in school			
	I12	**Allocate budget for disaster outreach activities**	- Integrate the DRR outreach activities through school events and school extra-curricular to share the budget allocated for these activities			

	I13	**Allocate budget for replacement/repair after disaster**				- Before disaster, consult with local government on developing fund for recovery - After disaster, report the damage to the local government and local DoET to consider and seek for financial help
	I14	**Allocate budget for monitoring facilities /infrastructure**				- Promote the culture of saving and protecting resources and facilities in schools - Consult with local government and DoET to monitor facilities and structural in an effective manner.
	I15	**Allocate budget for supporting students that have special needs**				- Consult with Study Encourage Society, Woman Union, etc. to set up a fund for supporting students with special needs
External relationship	**E3**	**Establish communication system between other schools/institutions**		- Through regular meeting between schools and DoET to facilitate the cooperation between schools		- Exchange information with other primary and secondary schools - Put priorities to the activities held by DoET for exchange information between primary schools
	E5	**Collaborate with local government during a disaster**	- Planning to attend all the meeting held by local government with school and get information related to DRR and strengthen school' relationship with local government	- Update frequently information from local government and provide relevant information when needed	- SMB is mainly responsible to communicate and keep update information from local government during disaster	
	E7	**Improve school to be used as evacuation for communities**		- Consult with local government and local DoET to improve school to be used as evacuation for communities	-Planning for strengthening school capacity in both structural and non-structural measures	
	E8	**Participation of school in DRR activities in communities**	- Put priorities to participate in DRR activities in communities	- Keep update and actively attend the DRR related activities in committees	- Make schedule to participate in DRR related activities held in community	
	E10	**School involve in disaster management planning of local community**				- School set up action plan based on the action plan of local community - Suggest that school principals should be included in the district Committee of Flood and Storm Control
	E12	**Mobilizing funds from parent-teacher association (PTA)**	- Set up the school activities to mobilize fund from parents			
	E15	**Shifting budget for disaster activities**			- To develop a flexible plan for financial management so that the fund from other activities can also be utilized for DRR activities when needed	

5.9 Key findings

In Central Viet Nam, where limited resources, logistic and infrastructure facilities cause many problems, optimal use of available human and financial resources, supporting systems is a prerequisite for reducing disaster and building resilience to the education sector. School-based planning for DRRE, which is based on school-specific resilience, will help teachers and students to identify the actual need and to effectively utilize the internal and external resources in promoting DRRE.

The process of school-based planning includes the five steps with different approaches were used. First, resilience of primary schools in different regions were mapping by results of a questionnaire survey for 218 primary schools in Hue Province and 76 primary schools in Da Nang City.

Second, actions for building educational resilience were created through focus group discussion among staff from provincial and district DoET, school principals and teachers. As a results, there are 51 actions were formulated from SDRA to contribute to the implementation of DRRE in schools. Of which, there are eleven actions need to be considered below Human resource and 15 actions for each of Institutional issue and External relationship.

Third, understanding on the role of stakeholders on 51 actions was clarified through stakeholder workshop. The most important role, also the leading role belongs to teachers. Teachers are stressed as key stakeholders on the implementation of both educational governance and educational activities, which contribute directly to the enhanced resilience of students and schools. Meanwhile, the role of students was not recognized adequately, as it merely focuses on supporting school teachers in DRR activities. Attentions therefore need to be paid on how to improve students' awareness and strengthened their role in the DRRE practices. The role of parents, especially in urban areas, is much lower than that in rural areas. Among external stakeholders, local government and local DoET has the most essential supporting role, especially in educational management activities. The role of academia and NGOs concentrates on consultant wherever relevant.

Fourth, the actions were ranked according to their completion in the scale of short-term (less than two years), medium term (from two to five years) and long-term (more than five years). As a results, Hue Province has 42 short-term actions and Da

Nang City has 49 actions, which need to be completed within the next two years. This illustrates not only the urgent needs of DRRE practices, but also the huge challenges for the education sector to address these needs on DRRE.

In conditions of limited resources, it is difficult to carry out all of 51 defined actions. Therefore, prioritization was made among the actions based on the two criteria: (i) the importance attributes, which was defined by the rate of variables, and (ii) the contribution attributes, or the contribution of actions into the overall resilience, which was defined by the correlation between variable score and overall resilience score. The top actions share among different regions including collaboration with local government, training for teachers and students, involve parents into disaster activities in schools, among others.

Finally, to provide ideas on how plan can be implemented among different regions, the four key information interviews were carried out with the four principals that have highest resilience level. Results show that for rural schools in Da Nang City, who also scored the highest among the four regions, important strategies focus on utilizing and strengthening cooperation among stakeholders as means to carry out actions. Of which, teachers and students play roles as key implementers for most of the actions. It is suggested from the school principals that the other stakeholders should also incorporate their role in DRR into the daily activities, as well as in the general plan. In this way, the actions on DRRE can be taken into effects and sustained to ensure the enhanced educational resilience

In summary, the output from the school-based planning process is the action plan involves participation of various stakeholders and schools will be the key actors. The action plan will be a crucial input for the development of the annual educational strategy and for the provincial socio-economic development plans. At the same time, the action plan will give guidance to the stakeholder on the implementation of DRRE activities through the scheme of two, five and ten years horizon. This will also be an important input for the establishment of Human resource Strategic Development of the province. In terms of the implementation mechanism, the finding from interview provides strategy of schools in different regions in response to DRRE challenges. It is noted from the result of the interview that, the inter-effects between different actions are recognized. For examples, setting up effective PTA structure and school-home notification also target to increase the community participation. This can be used as important lesson learnt for scaling up of DRRE in different regions. Toward this end,

school-based planning for DRRE is deemed suitable with conditions and circumstances of Vietnamese education, especially in the central regions where DRR is characterized by non-structural measures and capacity building for vulnerable communities.

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Chapter 6 Integration of disaster risk reduction into teaching and learning activities

Chapter 5 has formulated the educational resilience actions and develop action plan for Disaster Risk Reduction Education (DRRE) including the role of stakeholders, the time schedule and mechanism to implement the action in practice. This Chapter will provide an understanding on how school teachers perceive the actions on educational resilience in implementing DRRE. The expectation of teachers on teaching DRRE will be identified through questionnaire survey in urban primary schools in Hue Province and Da Nang City. After that, an analysis of the textbooks of primary education will be completed to understand the integrated contents related to natural disasters and the potential spaces for a more comprehensive incorporation of DRR. Results will have implications to the establishment of a model and approach for the integration of DRRE into teaching and learning activities.

Contents

INTEGRATION OF DISASTER RISK REDUCTION INTO TEACHING AND LEARNING ACTIVITIES

6.1 Introduction

The vital role of knowledge on disaster has been recognized by international frameworks as ways of integrating DRR education into teaching and learning activities in schools. The Hyogo Framework for Action (HFA) (2005-2015) highlighted a need of 'inclusion of DRR knowledge in relevant sections of school curricula at all levels' in order to achieve the goal 'use knowledge, innovation and education to build a culture of safety at all levels' (UNISDR 2007). Following the advocacy by the UNISDR 2006-2007 World Disaster Reduction Campaign on 'Disaster Risk Reduction Begins at School', countries have been implementing their own national agendas and declarations in promoting integration of disaster risk reduction education and school safety (UNISDR 2006). Another commitment on integration of DRR into school curricula by 2015 was made in the 2009 Second Session of the ISDR Global Platform for Disaster Risk Reduction, and later was reinforced at the 2011 Third Session of the Global Platform (UNISDR 2009, 2011).

In response to these, a growing number of schools throughout the world are including DRR as an important part of their curriculum. After the Bam earthquake, the central government of Iran has passed the School Earthquake Safety Action 2006 in the parliament with the integration of DRR into text books from 3rd to 11th grade (Ghafory-Ashtiany 2006). Ministry of Education, Union of Myanmar, through Myanmar Education Recovery Program (MERP), has key achievements in school disaster management and disaster prevention education (UNESCO 2010). Countries like Australia, Indonesia, Lao People's Democratic Republic, Nepal, New Zealand, the Philippines, the Republic of Korea, and Syria has gone mile ahead than systematic policy or institutional commitment (Bastidas 2011). Above all, one of the best practices of disaster education is the case study of Maiko High School educational program on DRR, which has been established since 2002 based on the lessons of the Great Hanshin-Awaiji Earthquake. This Environmental and Disaster Mitigation

Course is specialized for disaster management. It provides variety of aspects on DRR through 14 specialized subjects aside from the general subjects like English, Maths, or Science (Shiwaku 2007). DRRE in Japan is in place, together with disaster management for school infrastructures, and school and community networks (MEXT 2007). However, the systematic development and implementation of DRR curricula in schools throughout the country has yet to be realized in Japan (UNESCO and UNICEF 2012).

The importance of DRR education in school has been stressed by the Government of Vietnam after the adoption of HFA. In 2007, the *National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020* has a component on integrating DRR into school curriculum (GoV 2007). Nevertheless, until four years later in 2011, the Ministry of Education and Training (MoET) has developed the *Action Plan of Education Sector implementing National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020* (MoET Vietnam 2011). This firstly aims to improve awareness, provide knowledge and skills for officers, teachers and students. One of the indicator of achievement is that the integration of basic knowledge on natural disaster prevention, control and mitigation into education programs and extra-curricular activities will have been completed by 2015 (MoET Vietnam 2011).

In order to integrate DRR into teaching and learning activities in school, the role of well-prepared teachers as the key main facilitators is highlighted (Bonifacio 2010). Le (2012) in study of DRRE in Hue City found that DRRE is in its beginning phase, the government still in the on-going effort to recognize the role of formal education for DRRE. The study highlighted the needs on development of curriculum integrated DRR contents, training for teachers, and distribution of teaching materials as the most important steps for the implementation of DRRE. Gwee (2010) has argued that the legislative measures and specific guidelines are important, however, the attitude of actual implementer (i.e person-in-charge at the local education department, and more importantly, teacher-in-charge in schools) is much more important; that different enthusiasm of the implementer resulted in a difference in the implementation process. Proactive implementation may be seen if implementer is enthusiastic and are trained to adequate level (Gwee *et al.* 2011). Shiwaku (2007) confirmed that if teachers are trained and awared about DRR related issues, there is a large possibility that DRRE can have better chance to cover wider contents on DRR. Therefore, teacher training should focus on developing teacher abilities to transfer the knowledge and encourage

desire/interest, rather than to solely provide knowledge. According to the same author, DRRE should not aim to produce experts on DRRE, attention should be paid on improve students and teachers' understanding and interests in the DRR issues (Shiwaku *et al.* 2007). In the light of this argument, the understanding of teacher perception on DRRE is of tremendous importance to promote DRRE in Viet Nam.

6.2 Teachers' assessment

6.2.1 Questionnaire survey

To understand the teacher's awareness for the promotion of DRRE, questionnaire survey for teachers was conducted in all primary schools in urban areas of Hue City and Da Nang City. The main targets of the questionnaire are teachers whose responsibilities are related to DRR activities in schools or who have experience with DRRE. The questionnaire has two main parts, and the first part is to examine the perception of teachers on the implementation of EDRA. In this part of the questionnaire including the list of top 20 prioritized actions of urban schools in Hue City and Da Nang City (Table 6.1). School teachers were requested to rank the importance of actions according to the scale from 1 (not important) to 5 (very important). The second part is to quest for the recognition of teachers on DRRE, to understand the experience of teachers on teaching disaster related issues or the current status of DRRE teaching and learning activities, and to understand teachers' demand on the promotion of DRRE in school.

The survey was conducted in 75 primary schools in Hue City and 83 primary schools in Da Nang City. There are in total 150 questionnaires distributed in Hue City and 166 distributed in Da Nang City. In Hue City, 150 questionnaires were fully completed and returned (100 per cent of total sample) and in Da Nang City, 90 per cent (150 responses) of the total samples were collected.

6.2.2 Results of teacher's perception on the EDRA

The results show some trends on how the school teachers perceive in which order the proposed action measures should be implemented. This understanding on school teachers' perception is important as it helps the school in utilizing existing resources to implement the DRRE in an effective way.

Table 6.1 The top 20 actions in Hue City and Da Nang City

ID	Prioritized actions by teachers in Hue City	ID	Prioritized actions by teachers in Da Nang City
P6	Carry out regular check on school facilities and equipment	P8	Provide emergency supplies
P3	Set up emergency exit door	P6	Carry out regular check on school facilities and equipment
P15	Establish recycle system	P13	Ensure food safety conditions in school
I7	Disseminate disaster related information and materials	P12	Carry out regular check on hazardous materials
I6	Establish school early warning system	P11	Implement environmental protection campaigns
I5	Establish disaster recovery plan	P1	Carry out regular check on buildings
I12	Allocate budget for disaster outreach activities	I7	Disseminate disaster related information and materials
I11	Allocate budget for DRR activities within school	I6	Establish school early warning system
I10	Provide regular disaster training for disaster group	I3	Incorporate DRR into school syllabus
I1	Incorporate DRR into school planning	I1	Incorporate DRR into school planning
H9	Assess the level of participation of students in disaster activities	H5	Share disaster preparedness plan to teachers and staff
H8	Provide regular disaster training for students by schools	H3	Provide regular disaster training for teachers and staff in schools
H4	Assess the level of participation of teachers in disaster activities	H15	Involve parents in disaster activities
H3	Provide regular disaster training for teachers and staff in schools	H14	Share disaster preparedness plan for parents
H15	Involve parents in disaster activities	H13	Set up school-home emergency notification system
H14	Share disaster preparedness plan for parents	H10	Share disaster preparedness plan to students
H12	Provide regular training for parents	E8	Participation of school in DRR activities in communities
E8	Participation of school in DRR activities in communities	E7	Improve school to be used as evacuation for communities
E5	Collaborate with local government during a disaster	E5	Collaborate with local government during a disaster
E12	Mobilizing funds from parent-teacher association (PTA)	E15	Shifting budget for disaster activities

In case of Hue City, result from analyzing the action prioritized by teachers shows that DRR measures related to improve human resources (training for teachers, training for students, assess level of students participate in DRR activities, training for parents, and share school disaster preparedness plan for parents, among other) and strengthen external relationship (collaboration with local government, encourage the participation of school in community activities on DRR). All of the activities related to human resources were highlighted in the top ten actions. This has proved that

teachers in Hue City aware about the importance of teachers and students in the leading role of the DRRE implementation.

In Da Nang City, the teacher training and involvement of parents in DRR activities are ranked as the first priorities. Aside from the human resources, teachers in Da Nang City has concerned for the improvement of physical conditions and external relationship such as providing emergencies supplies and promoting participation of school in community activities, among other. In particular, teachers in Da Nang City highlighted the incorporation of DRR into school planning, school curriculum and dissemination of DRR related materials.

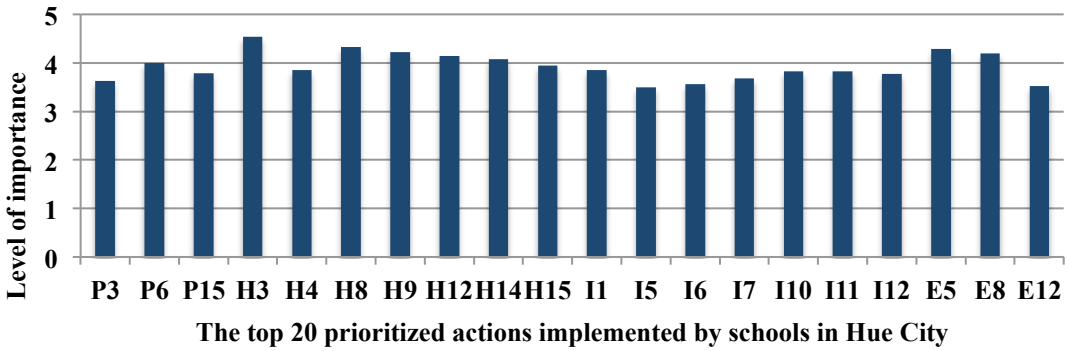

Figure 6.1 The level of importance of prioritized actions for schools from teachers' perspectives in Hue City

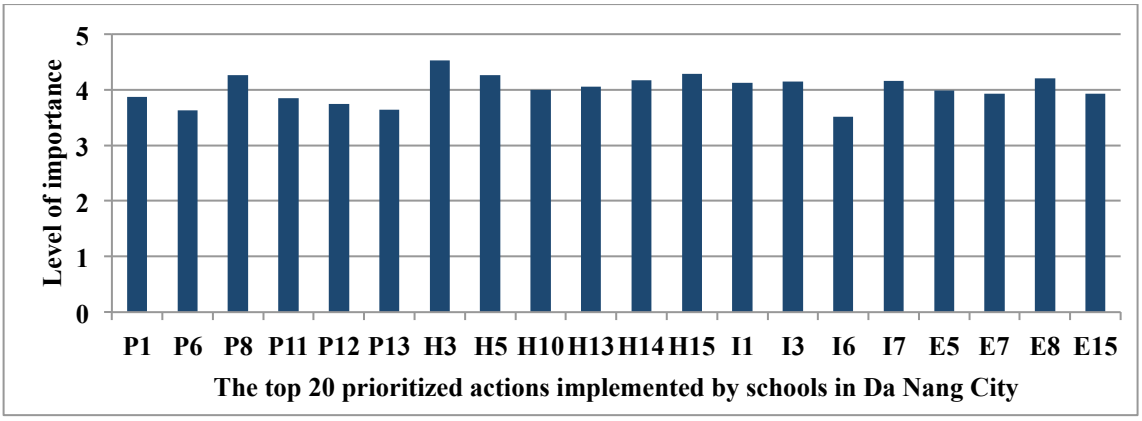

Figure 6.2 The level of importance of prioritized actions for schools from teachers' perspectives in Da Nang City

In sum, in order to improve the level of disaster resilience and enhance capacity of school to carry out DRRE, both cases have highlighted the teacher training, as well as student training, and parent involvements as the most important activities. These can be achieved through the integration of DRR into teaching and learning activities in schools.

6.2.3 Results of teacher' experience and demands on the implementation of DRRE

In this part, results on the current status of teaching and learning activities on DRRE, as well as the desires of teachers in promoting DRRE in school will be presented.

Teachers' recognition on DRRE

Teachers were asked whether they are affected by natural disaster. Figure 6.3 revealed that a high percentage of respondents were impacted by natural disasters, mainly by floods (higher in Hue City, account for 40 per cent) and typhoons (highest in Da Nang City, account for 49 per cent).

Were you affected by natural disasters? If yes, what kind of natural disasters?

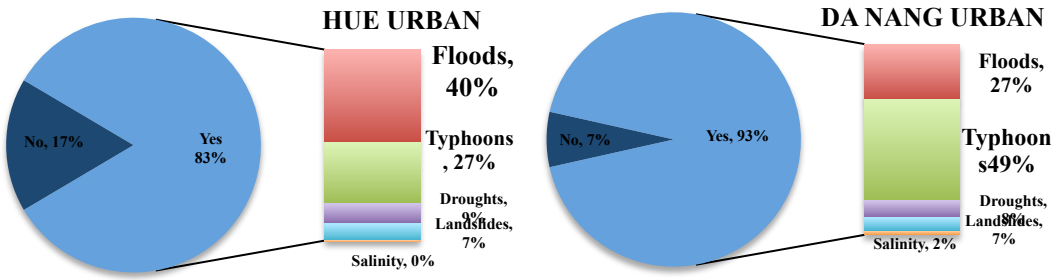

Figure 6.3 Impacts of disasters perceived by teachers in Hue City (left) and Da Nang City (right)

The survey also highlighted that differently from the Da Nang City, where 99.3 per cent of teachers believe that the strong typhoon such as in 2006 will happen again in the future while, 48 per cent of teachers Hue City think that the historical flood in 1999 is a one-time happen (Figure 6.4).

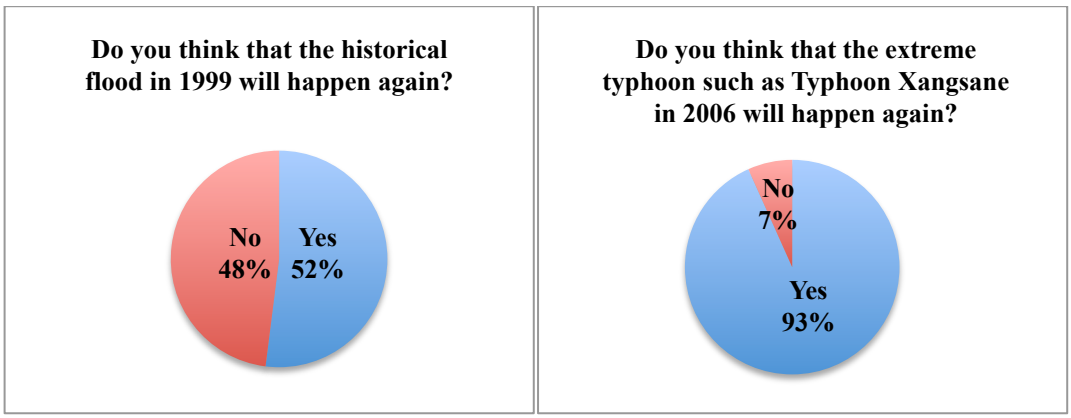

Figure 6.4 Teachers' awareness on the likelihood of natural disasters

In term of teachers' understanding on the main objectives of DRRE, the survey found that in Hue City, about 9 per cent of teachers think the objective of DRRE is to inform about natural disaster or learning about the causes and effects of natural disaster. More than 91 per cent of teachers aware that the main objective of DRRE is to encourage the development of actions, so that students will response properly to disasters, yet only 29 per cent of them perceived DRRE as a process to develop the action from nurturing the knowledge and skills. It is important to note that in Da Nang City, the majority of teachers (97 per cent) understand that the main objective of DRRE is to encourage the development of actions, so that students will response properly to disasters. It can be assumed that the level of awareness of teachers on DRRE is quite high, yet insufficient to bring about concrete change toward the enhancement of students' performance.

Regarding to the understanding of teachers on the direction related to DRR issues from provincial and district DoET, there is only 10 per cent of teachers in Hue City and 21 per cent of teachers in Da Nang City confirmed that they received and understood clearly about the direction of Da Nang DoET on guiding DRRE activities in school (Figure 6.5). There are nearly 90 per cent of teachers in both Hue and Da Nang has agreed that there is a need of more details and specific guidance for the integration of DRR into curriculum, or extra-curricular activities, or both of the two types.

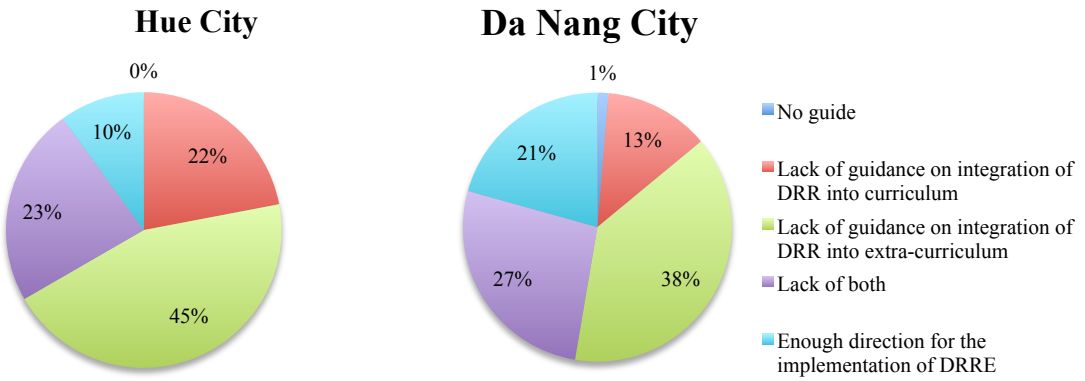

Figure 6.5. Direction on the integration of DRR contents into curriculum and extra-curricular activities by DoET

Teachers' experiences on teaching disaster

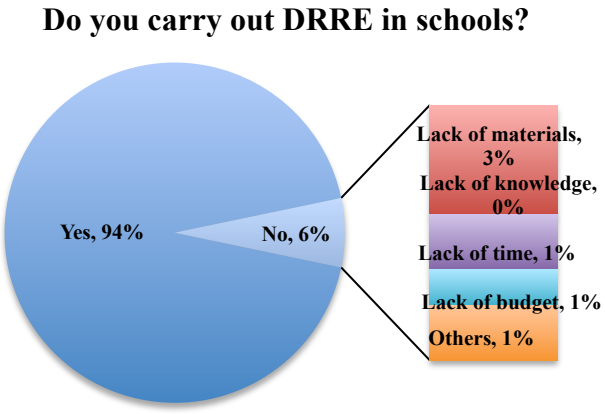

Figure 6.6 Percentage of teachers are implementing DRRE and the main barriers

In Hue City, 100 per cent of teachers confirmed that they have experience with teaching about disasters, while that number of Da Nang City is about 94 per cent. The remain of teachers claimed that they could not carry out disaster education mainly due to lack of materials, and also limited time, budget constraints and others such as not interest, not necessary, etc (Figure 6.6).

When asked about what type of climatic disasters that teachers mentioned in their lessons, many respondents agreed that they included a wide range of natural disaster from flood, typhoons, droughts, landslides, salanity, and others such as earthquake, cyclone, etc. The results also reflected that there exist a link from the way teachers perceive the impacts of disasters and the type of disasters that they used to teach in school, which can be seen clearly from the proportion of floods and typhoons (Figure 6.7).

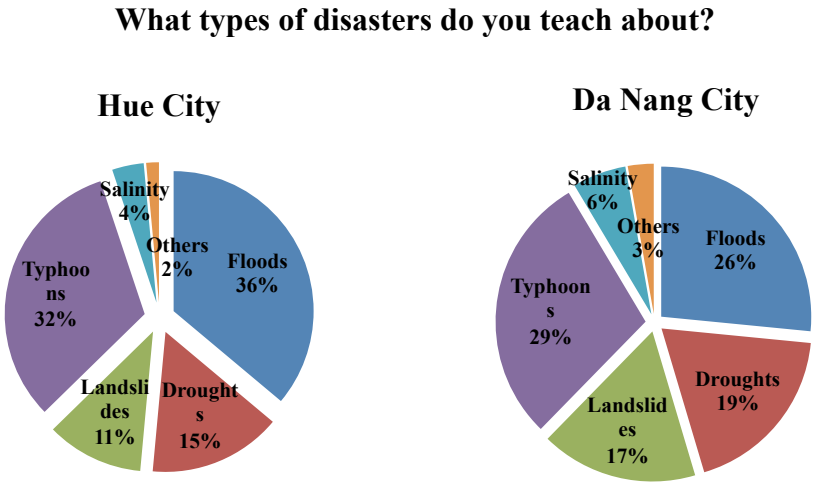

Figure 6.7 Types of natural disasters that teacher are teaching in class

One of the most critical concerns of teaching about DRR in school is the approach of either bringing the disaster related contents into the lessons in class or into activities out of class or combination of both. In Hue City, most of teachers (98 per cent) are adopting a mixture of curriculum and extra-curricular activities activities. Many Da Nang teachers (83 per cent) are also teaching DRR base on the connection of inside and outside class activities. At the same time, there are 11 per cent of teachers mainstreaming DRR into curriculum only and, 6 per cent focus on extra-curricular activities only.

In the education system in Viet Nam, curriculum, subjects, and teaching plan are decided by textbooks. This has strong implication to the integration of DRR at the beginning phase should be taken through textbook driven approach. This is to ensure that teachers will be able to take up the new hazard and disaster related textual materials.

To understand what subjects also textbooks that teachers are using as entry points for DRR knowledge, the question "What subjects do you use to teacher about DRR contents?" was added. As can be seen from Figure 6.8, both teachers in Hue City and Da Nang City are teaching about disasters in the lessons of Vietnamese, Ethics, Science and Nature (for grade 1,2, and 3), and Geography (for grade 4 and 5).

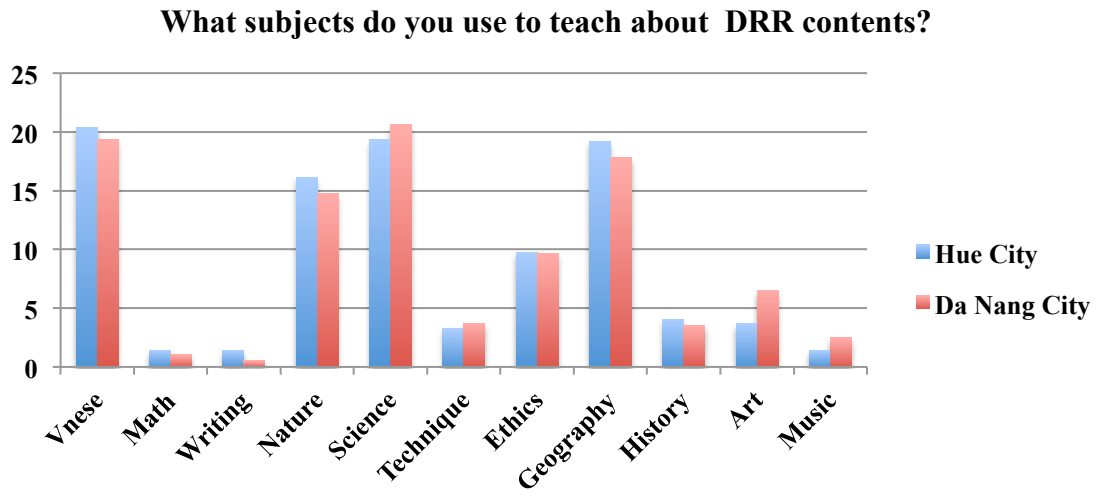

Figure 6.8 Subjects and main entry points for DRR contents

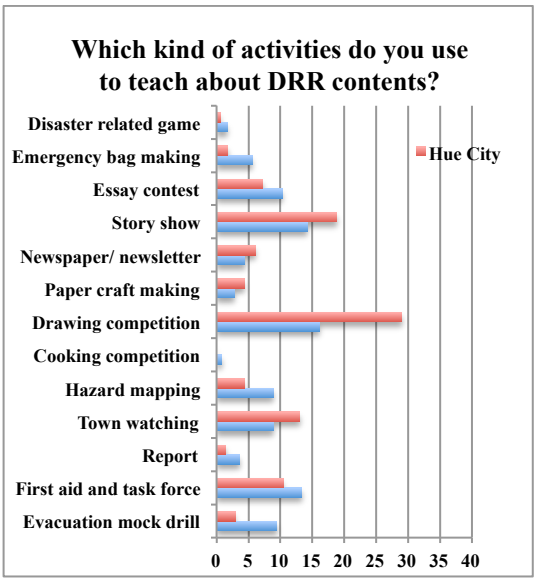

Figure 6.9 Extra-curricular activities using to teach DRR

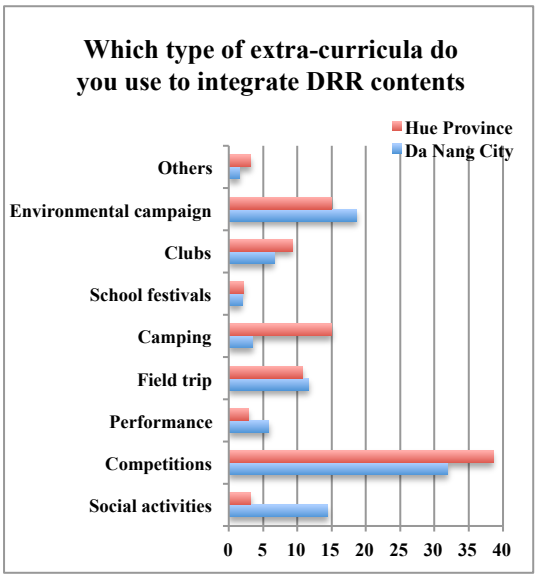

Figure 6.10 Type of extra-curricular using to integrate DRR contents

Aside from the incorporation of DRR into teaching activities in class, the extra-curricular activities activities are also utilized to impart skills and actions on DRR. Figure 6.9 show various extra-curricular activities that teachers are taking to educate DRR. The top five activities for both Hue and Da Nang are drawing competitions, story show, town watching, first aid task, and essay contests, respectively. As can be seen in Figure 6.10, the most popular extra-curricular used for DRRE is competition. Besides, different types of extra-curricular are undertaking in DRRE such as environmental campaign, field trip, and social activities, among others.

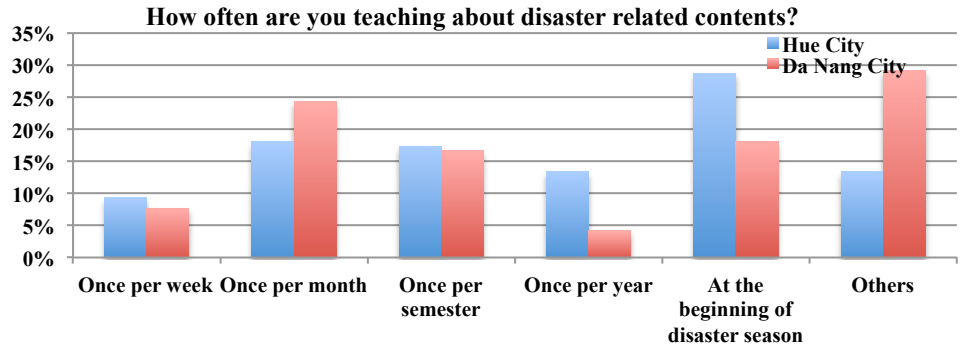

Figure 6.11 Time schedule of disaster education in schools

Regarding to the time for implementation, it is quite different between Hue City and Da Nang City (Figure 6.11). While in Hue City, the largest number of teachers (nearly 30 per cent) are teaching the contents related to disasters at the beginning of flood or storm seasons among others, teachers in Da Nang City mainly chooses to

follow the content related to disasters in the textbooks. As such, the results again show the impacts of textbook-based system on the implementation of education for DRR.

6.2.4 Teachers' needs for the advancement of DRRE

While 100 per cent of teachers in Hue City show the desire of integrating DRR into teaching and learning activities, only about 80 per cent of teachers in Da Nang City want to carry out DRRE. The reasons are surprisingly not due to time constraint, but mainly due to lack of materials. However, according to Duggan (2001), there is abundant of materials related to disaster education in Viet Nam (Duggan 2001). This should be linked to the analysis in Chapter 5 about actions prioritized for planning in Hue City and Da Nang City, which related to dissemination of materials and information on DRR. The repetition of knowledge and materials constraints here shaped on the common assumption that not only the teachers training are crucial, but also better educational materials and resources needed to be equally and properly distributed.

In terms of expectation for teacher training on DRR issues, the majority of teachers in Hue City thought that it should be carried out by schools, while in Da Nang City, the role of stakeholders perceived by teachers distributed for schools, district DoET, provincial DoET and NGOs (Figure 6.12). This proposed a participatory approach in carrying out disaster training rather than leading only by schools in Da Nang City. However, it seems to conflict with the data from stakeholder analysis that the district DoET, provincial DoET and NGOs in Da Nang City did not perceive teacher training as their responsibility. As such, there exist the gap between teachers' expectation and the supporting mechanism for training on DRR.

In Viet Nam, training for teachers is of tremendous importance, especially for teachers to take up new educational programs such as DRRE. Figure 6.13 shows teachers' needs to improve the current situation for the implementation of DRRE. In the questionnaire, multiple choices were designed for this type of question. The majority of teachers both in Hue and Da Nang revealed the desire to get support forms of providing materials and training course.

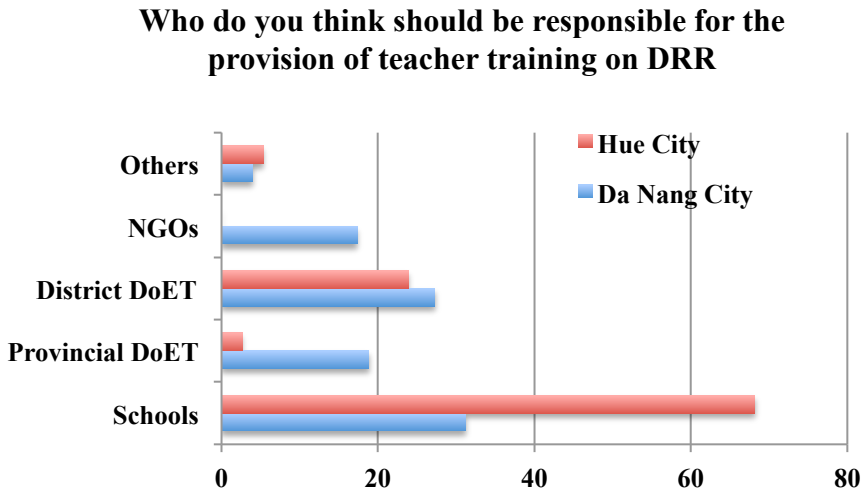

Figure 6.12 Responsibility of stakeholders on DRR training perceived by teachers

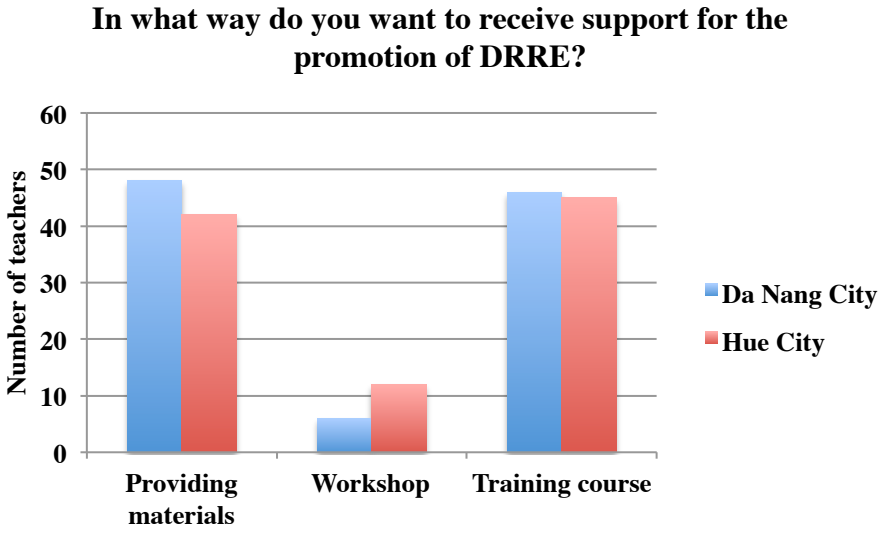

Figure 6.13 The ways to support teachers in carrying out DRRE in schools

6.2.5 Findings from teachers' assessment

Result from teachers' perception assessment shows that the most concerns of teachers regarding to the implementation of DRRE are actions related to training on DRR such as teacher training, student training, as well as raising awareness for parents. The highest important level of teacher training on DRR among the top 20 prioritized actions shaped on the assumption that teacher training should be the entry point for the integration process of DRR into teaching and learning activities.

Besides, the result form survey on teachers' experience in teaching DRR reveals that teachers aware about DRRE and are trying to integrate DRR contents into teaching and learning activities, either by means of curriculum or extra-curricular

activities. Most teachers are teaching about disasters related issues mentioned literally in textbooks. This features a textbook-driven approach for the integration of DRR into teaching and learning activities especially in the beginning phase of the process. However, the level of integration is little and inadequate. Among the four given reasons, the lack of materials and time were seen as crucial problems. To solve this problem, not only larger distribution of materials and resources are needed, but also training teachers on how to proper manage time and better develop teaching plan, which covers the DRR issues, can be considered as applicable solution in the current situation.

Another challenge to the DRRE practice is that there is no direction from DoET specifically focused on the implementation of DRRE, or if exists, it still has not satisfied teachers' needs. A guideline of the approach to integrate DRR into both curriculum and extra-curricular activities is recognized as the most important, yet has not been developed in a systematic and official way. For this reason, later in this chapter, effort will be made to develop a model to integrate the DRR into curriculum, cross-curricular subjects and extra-curricular curricular, which also takes into account the specific conditions of Central Viet Nam.

6.3 Analysis of DRR related contents in the national curriculum at primary level

Viet Nam has the national curriculum and national textbooks, therefore, in order to understand the current DRR education in primary education system, the analysis of textbooks of all subjects at primary levels is carried out. In the following part, the textbooks (year 2011-2013) of each subject of all five grades are review to examine the DRR contents, which literally mentioned in textbooks or did not directly mention but related to the topics or even did not related but its content can be linked to disaster issues.

6.3.1 DRR related contents in Vietnamese textbooks

The DRR contents in Vietnamese textbooks are mostly focus on the description and impacts of the event such as floods, storms, cyclones (Table 6.2). However, the description is mainly explanation a phenomenon, not really focus on the actions to response to the event (Figure 6.14 and Figure 6.15). Although in some topics, mitigation and response are mentioned (Figure 6.16 and 6.17), yet to the level that

student can fully acquire and take proper actions. Some topics on indigenous knowledge (Figure 6.18) on weather knowledge are also provided.

Figure 6.14.An explanation of cyclone in Vietnamese textbooks

Figure 6.15 The flood season

Figure 6.16 People response to disaster

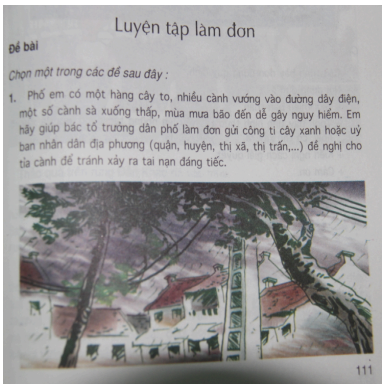

Figure 6.17 Explain about the mitigation measure in case of typhoon

Figure 6.18. Indigenous knowledge on the weather in the Vietnamese textbook (grade 1, lesson 60 and 85)

Table 6.2. DRR related contents in the Vietnamese textbooks at primary level

Lessons	Title	Contents related to DRR	Direct (D) or Indirect linked to DRR	Phenomenon/Information	Cause	Impacts	Mitigation/ Prevention	Preparedness	Response	Recovery
	Grade 1									
60	"ieu"	Indigenous knowledge on rainy and sunny season	I	✓						
85	"uon"	Indigenous knowledge on rainy and sunny season	I	✓						
92	"oay"	Cyclone	D			✓				
	Grade 2									
20	Four seasons – Mr Manh fights with the God of the wind	Story about typhoon and how local people protect their house and response to typhoon				✓			✓	
	Four seasons – The flood season	People living with flood in Southern areas				✓	✓			
	Grade 3									
4	Family	Impacts of typhoon				✓				
7	Community	The relationship between people in local community in the normal and emergency time							✓	
	Grade 4									
27	Heros	Saving people's life during the flood occurred							✓	
Grade 5										
9	Human and nature	Flood in the Southern areas				✓				
11	Save the green	Typhoon and its impact to human life Prevention measure to typhoon				✓	✓			
13	Save the green (cont.)	Tell a story about a hero that save life during a disaster							✓	

6.3.2 DRR related contents in Nature and Society textbooks

As can be seen from the Table 6.3, most of the topics are not related to DRR issues. However, to an extent, these contents can be identified as disaster issued as it opens up the opportunity for the integration of DRR contents. For example, the lesson 20, Safety on the way to schools can be used to warn students about the risks during the flood. The lesson 13, 18 and 36 mention about the environmental and sanitation issues. Here there is a possibility of development linkages between environment, sanitation and disaster issues.

Table 6.3. DRR related contents in Nature and Society textbooks

Lessons	Title	Contents related to DRR	Phenomenon/information	Cause	Impacts	Mitigation/ Prevention	Preparedness	Response	Recovery
Grade 1									
20	Safety on the way to school	The risk that students could face on the way from home to school in the normal and flooding time	✓						
33	Hot days and cold days	Description of the weather events such as hot wave and extreme cold weather	✓						
Grade 2									
13	Keep the house and surrounding environment clean	Protect environment around house and living places	✓						
18	Keep school clean and beautiful	Keep school clean and beautiful	✓						
Grade 3									
36	Keep sanitation in school and house	Keep sanitation in school and house	✓						
50	The sun	The sun	✓						
65	The climatic zones	The climatic zones	✓						

6.3.3 DRR related contents in Ethics textbooks

Moral education is incorporated in the formal curriculum and taught as a single subject of study at all levels of the educational system. This has been legalized by the Education Law implemented in 1998. The overall objective of education, as stated in the Law, aims to produce 'fully developed Vietnamese citizens. These must acquire morals, knowledge, good health, aesthetic sense, occupation, and loyalty towards national independence and socialism; who nourish personality and capability essential to fulfil the mission of building and protecting the country (SRV MOET, 2004c, Chapter One, Article 2). In effect, it is also stated in the Education Law 1998 that the content of education must place a strong emphasis on moral and citizenship education. Therefore, moral education occupies significant parts in the curriculum, focusing on character education, citizenship education and political education in primary, secondary and higher education respectively. The curriculum of moral education in primary and secondary schools is centrally controlled through the use of a series of compulsory textbooks, which are titled Ethics education for Grades 1–5 (ages 6–10) (SRV MOET, 2003a, b, c, d, e) and Citizenship education for Grades 6–

12 (ages 11–17) (SRV MOET, 2003f, g, h, i, 2004a, d, e) and through various extracurricular activities (Doan 2005).

Ethics or moral education in Viet Nam is associated with standards of behavior justified by people as right and proper, and is to be conducted willingly without the interference of law. It is also understood as perspectives, viewpoints and behavior of people in such social relations as self in relation to other persons, groups and organizations (SRV MOET, 2004a, p. 69). The content of Ethics in the primary school focuses on character and personality building, which aims 'to teach students to respect, love and show good behavior towards.

Table 6.4 Focus and topics of primary school moral education (Doan 2005)

Grade	Focus	Sample topics
Grade 1 Age 6	Cultivation of virtues (tidiness, obedience, friendliness, politeness)	Being neat and tidy Nourishing family love
	Building proper manners and behavior at home and school (respect for elderly, teachers)	Being respectful and obedient to teachers Being cooperative with friends
	Understanding and appreciating the natural environment	Saying thanks and apologies Protecting plants and trees in public places
Grade 2 Age 7	Cultivation of virtues (punctuality, truthfulness, respect, labor, politeness)	Being punctual Recognizing mistakes and correcting mistakes
	Development of love for nature, love for community	Increasing interest in doing housework Caring for friends Being polite while talking, making suggestions and requests Helping the disabled Protecting animals
Grade 3 Age 8	Cultivation of virtues, development of cultural awareness, friendly attitudes towards people from other countries; appreciation of soldiers and national defenders	Showing respect to Uncle Ho Chi Minh Keeping promises Working independently Helping neighbors Appreciating veterans and soldiers Respecting international visitors Respecting other people's confidential matters Saving water resources
Grade 4 Age 9	Building personality (honesty, hardworking, self-discipline, self-esteem)	Being studious Active participation in teamwork
	Developing proper relations with other people (friends, family members, neighbors)	Being punctual Never telling lies Helping bullied children Helping teachers Keeping promises Saving money and time Taking care of grandparents Helping neighbors
Grade 5 Age 10	Cultivation of virtues (sincerity, cooperative spirit, respect for other people)	Sincerity in study and work Cooperative attitude in study and work
	Development of understanding of foreign countries, kindness to foreigners, appreciation of national identity	Respecting former teachers Sharing emotions with friends Making grandparents and parents happy Respecting the elderly

grandparents, parents, teachers, older people; to love brothers, sisters, and friends; to be sincere, confident, eager to learn, and appreciative of nature's beauty' (SRV MOET, 2004c, Chapter One, Article 20). The syllabus of moral education in each grade is typically topic-based. At primary level (Grades 1–5), ethics lessons are taught through pictures, games, storytelling, rhythm and rhyme verse. At the end of each lesson there are always comprehension questions followed by inference questions. The lesson content falls into five main aspects: (1) matters relating to self, character and personality; (2) relationship of self to other people; (3) matters relating to nature; (4) matters relating to national identity and love for nation; and (5) matters related to community and society. The focus and topic areas of the moral education taught in primary schools are summarized in Table 6.5.

Table 6.5 shows the contents related to DRR mentioned in textbooks as follow:

- The role of local government
- The role of public construction and services
- The role of NGOs and UN system, including the support for DRR

Besides, topics related to environmental protection and natural resource protection is also provided (Figure 6.19 and 6.20). In particular, the lesson 12, *Actively participate in humanitarian activities*, directly mentioned in words the impacts of natural disasters. The lesson also gives one specific example on the earthquake happened in 2004 (Indian Ocean earthquake and tsunami in 2004).

Figure 6.19 Actively participate in humanitarian activities (Lesson 12, grade 4)

Figure 6.20 Understanding about UN (Lesson 13, grade 4)

Table 6.5 DRR related contents in Ethics textbooks

Lessons	Title	Contents related to DRR	Phenomenon/Information	Cause	Impacts	Mitigation/ Prevention	Preparedness	Response	Recovery
Grade 4									
11	Maintain the public construction	Understand the role of public construction, espcially in time of disaster such as flood and typhoon	✓						
12	Actively participate in humanitarian activities	When flood occurs, it is important to help each other during and after the flood						✓	✓
13	Understanding about NGOs	The role of NGOs including support for DRR	✓						
14	Environmental protection	Environmental protection and its link to natural disasters mitigation	✓						
Grade 5									
2	Responsible for your work	Own responsibility and what should be do in case of disaster	✓						
8	Cooperation with people	Cooperation with local people and know how to call for help in the emergency situation	✓						
10	Local People's Committee	Understand about the Local People's Committee	✓						
13	Understanding about UN	The role of UN bodies including support for DRR	✓						
14	Protection of natural resources	The role of natural resources and effective use of natural resources	✓						

6.3.4 DRR related contents in Science textbooks

The Science textbooks provide an understanding on different aspects of environmental management such as water management, air pollution, etc. Therefore, linkages between the water management, environmental management and disaster management can be seen clearly. The content of DRR in the Science textbooks is not only focus on the description of phenomenon but also more on mitigation, prevention and response to floods and typhoons (Table 6.6).

Table 6.6. DRR related contents in the Science textbooks

Lessons	Title	Contents related to DRR	Phenomenon/Information	Cause	Impacts	Mitigation/ Prevention	Preparedness	Response	Recovery
Grade 4									
17	Prevent drowning accidents	What to do and do not to prevent drowning accidents, especially during the flood season				✓	✓	✓	
28	Water resource protection	The importance of water resource and the way to protect water resource	✓						
29	Water saving	The role of water for daily life and during emergency situation	✓						
38	Light winds, strong winds; typhoon prevention and response	Mechanism, cause and impacts of typhoon Prevention, mitigation, preparedness and response to typhoon	✓	✓	✓	✓	✓	✓	
39	Air pollution	The impacts of air pollution to human health	✓						
40	Air protection	The importance to protect the atmosphere	✓						
54	The role of heat to human life	Global warming	✓						
Grade 5									
65-69	Human impacts on environment	The activities from socio-economic development has impacted environment in different ways, including causing natural disasters such as floods and typhoons. The way how people mitigate and reduce disaster risks	✓	✓	✓	✓			

6.3.5 DRR related contents in Geography textbooks

Among the subjects at primary level, the Geography covers the most various content related closely to disaster issues. As can be synthesized from the Table 6.7, the topics of DRR include the understanding of phenomenon, causes and impacts of a wide range of disasters such as river flooding (Figure 6.21), flash floods, typhoon, salt intrusion, drought (Figure 6.22). The mitigation, prevention, and response actions are described in details. Particularly, the linkages between human activities, natural disasters and socio-economic development are clearly mentioned. For example, in the lesson 3 and 4, the life and producing activities of the people in Hoang Lien Son and

mountainous areas is explained as the causes of deforestation and leading to flash flood. The application of ladder field in this area has help in mitigating the impacts of flash flood by reducing the speed of the water flow.

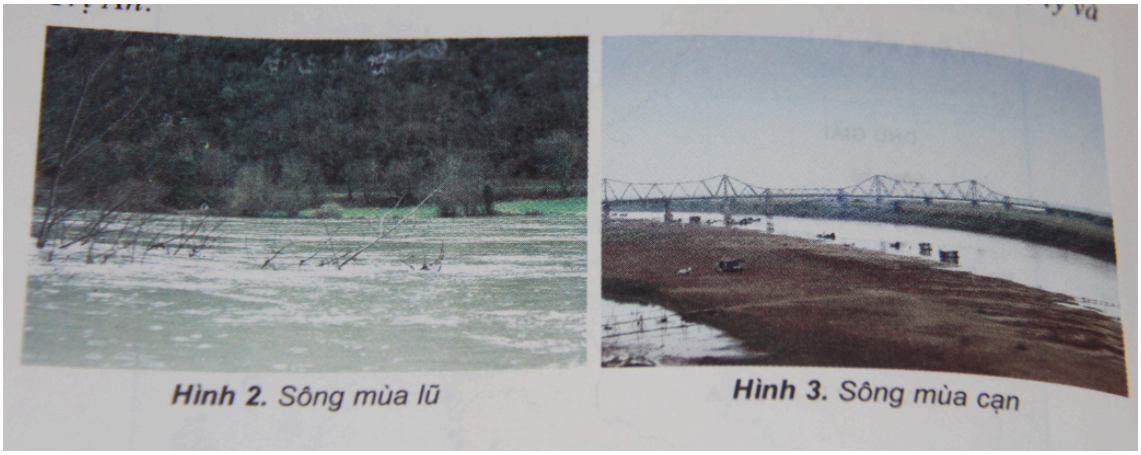

Figure 6.21. The river in the flood (left) and dry season (right) (Geography 5)

Figure 6.22. Drought and flood (Geography 5)

Table 6.7. DRR related contents in Geography textbooks

Lessons	**Title**	**Contents related to CCA and DRR**	**Phenomenon/information**	**Cause**	**Impacts**	**Mitigation/ Prevention**	**Preparedness**	**Response**	**Recovery**
	Grade 4								
3	Production activities of the people in the Hoang Lien Son	Cause of flash flood (deforestation) Role of ladder field in mitigate impacts of flash flood		✓	✓	✓			
4	The Northern Midlands	The impacts of deforestation and slash and burn and the cause of floods Planting tree will help to		✓	✓	✓			

Lessons	Title	Contents related to CCA and DRR	Phenomenon/information	Cause	Impacts	Mitigation/ Prevention	Preparedness	Response	Recovery
		mitigate the impact of floods							
5	Highlands	Flood in highlands	✓	✓	✓				
11	Northern plain	Mitigation measure of flood using dam system			✓	✓			
15	Hanoi Capital	Floods occur more frequent in Hanoi	✓	✓	✓				
16	Hai Phong City	Typhoon and its impacts in coastal cities	✓	✓	✓				
17	Southern plain	Flood and cause of flood in low-land areas	✓	✓	✓				
22	Can Tho City	Living with flood	✓			✓	✓		
24	Central coastal plain	Impact of flood and typhoon	✓		✓	✓			
	Grade 5								
3	Impacts of climate	Causes and impacts of flood, typhoon and drought	✓	✓	✓				
4	Rivers	Cause of river flooding	✓	✓					
5	Coastal areas	Impacts of typhoon in the coastal areas	✓		✓				
6	Land and forest	Typhoon, flood and sand intrusion. Role of forest, especially mangrove forest in mitigating damages from typhoon and flood	✓	✓	✓				

6.3.6 Findings from the analysis of textbook

The results from curriculum analysis show that DRR related topics can be found in Vietnamese for all five grades, in Nature and Society at grade 1, 2, 3, and in three subjects of Science, Ethics, and Geography at grade 4 and 5 (Table 6.8).

Table 6.9 provides a summary of contents related to DRR being covered in the textbooks of Vietnamese, Nature and Society (grade 1, 2, and 3) and Vietnamese, Ethics, Science and Geography (grade 4 and 5). As can be seen from the results, a number of the key DRR topics and competencies are already in existing textbooks. By learning these subjects, the mechanism, causes, and effects of disasters can be provided as part of DRRE. Furthermore the, information and knowledge on past disasters are provided. This will equip students with basic knowledge on disasters and DRR, yet not enough. The different role of stakeholders, in particular the linkage between the natural and social issues, or between disaster and environment alike is not

clear. According to a study on potential age-appropriate learning of UNICEF (2013), children at the age from 6 to 8 (equal to grade 1 to 3) should have access to environments, and from age 9 to 10 (equal to grade 4 and 5) should be encouraged to have interests in environmental related issues.

Table 6.8 Track of DRR contents in the national textbooks of Viet Nam

Subjects	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**
Vietnamese	YES	YES	YES	YES	YES
Mathematics	NO	NO	NO	NO	NO
Nature and society	YES	YES	YES		
Science				YES	YES
Geography and History				YES	YES
Ethics	NO	NO	NO	YES	YES
Arts	NO	NO	NO	NO	NO
Foreign languages	NO	NO	NO	NO	NO
Music	NO	NO	NO	NO	NO
Technology	NO	NO	NO	NO	NO

Table 6.9 Summary of contents related to DRR being covered in the textbooks

Types of hazards	Flood, flash flood, river flood, typhoon, soil erosion, river erosion, drought, extreme events (hot wave, extreme cold weather), sand intrusion
Causes and effects	- Human activities impacts on environmental (deforestation, slash and burn, etc.) - Damage of disasters on human lives, human health, and socio-economic development
Four cycles of DRR	- Prevention and mitigation activities: keep sanitation in schools and house, as well as surrounding environment; planting trees, etc. - Preparedness activities: reinforce house and roof before typhoons - Response activities: what to do/not do to prevent drowning, how to save people's lives in a proper way, cooperation with community and seeking for helps during emergency - Recovery activities: help each other to recover disaster by giving money and supplies

Result from the review of textbook has proved that DRR related issues exist in the current curriculum (which base on the textbooks), yet insufficient for a comprehensive DRRE. In order for existing knowledge in the textbooks to be translated into actions, as well as to encourage more interests and desires on DRRE, following suggestions are proposed:

- The integrated curriculum on DRR should based on a prescribed syllabus that sets out such criteria as student learning objectives and outcomes on DRR, approaches to interactive learning and teaching strategies and scope and sequence frameworks setting out a plan for coverage of content, skills and problem solving tasks related to DRR.

- As not all the issues related to DRR will be able to mentioned literally in the textbook, and it should not. It is therefore important for teacher to have a good knowledge on DRR, which can be achieved through teacher training, so that they can make a better link from the content of the lesson to the content DRR issues. In this way, the integration of DRR can be carried out for all subjects without bringing more contents into the curriculum.

- There is a need for a linkage between the content of DRR in different subjects, what is learnt in one subject will be linked and fed into what is learnt in other subjects that related to DRR.

- There exists the knowledge that link directly to disaster, yet other are not mentioned literally and leave spaces for the integration of DRR contents. Recommendations to fulfill these spaces will be presented later in this chapter.

- Potential entry points for the integration of DRR in terms of its relevant to the subject's goals, contents and contexts:

- Vietnamese, Nature, and Society for grade 1, 2, and 3
- Vietnamese, Ethics, Science, and Geography for grade 4 and 5

- The linkage between environment and disasters, human and disasters, in particular in the local context need to be improved. This can be done by the integration of DRR into the local education. Besides, the skills for preventing, mitigating, response and recovery needed to be strengthened though the integration of DRR into life skill education. Finally, integration of DRR into extra-curricular activities will give students opportunities to strengthen their knowledge and practice actions on mitigation/prevention, preparedness, response and recovery.

6.4 Process to integrate DRR into teaching and learning activities

Based on the results of questionnaire survey and review textbook, the following part will provide the model to incorporate DRR contents into the curriculum, cross-curriculum and extra-curricula activities. This model took the spirit of KIDA model, of which K is for knowledge, I is for Interest, D is for desire, and A is for Action (Shaw *et al.* 2009). According to this concept, the ultimate goal of disaster education is to equip teachers and students with proper knowledge, encourage their interests and desires, foster skills and actions' development. In the KIDA tree, the actions are the fruit nurtured from energy of interests/desires and fed by knowledge. Similarly, the model to promote DRRE (Figure 6.23) in teaching and learning activities follow the steps: (1) to provide knowledge and make teachers and students aware of disaster risks, (2) to stimulate interest and curiosity so that students want to know more about disaster risks and have desire to know how to reduce disaster impacts, and (3) to support students in developing appropriate actions to prepare for and response to natural disasters.

- *Integration into curriculum*: Textbook-driven approach will be applied at the school level and the selected subjects as carriers for DRR contents are Vietnamese, Nature and Society (for grade 1,2,3) and Vietnamese, Ethics, Science and Geography (for grade 4,5).

- *Integration into cross-curriculum*: Symbiosis approach will be applied to integrate DRR contents into the two selected subjects are life skill and local education.

- *Integration into extra-curricular activities*: The integration of extra-curricular activities will be done to supplement the practical aspects of the integrated knowledge on DRR that students learn in class.

The following part will describe in details each part of the model, as well as the advantages and disadvantages in promoting teaching and learning activities on DRRE using this model. Following the model is an example on how the existing contents related to DRR in the textbooks can be utilized in teaching and learning DRR through curriculum, cross-curricular subjects (life skill education and local education), and extra-curricular activities.

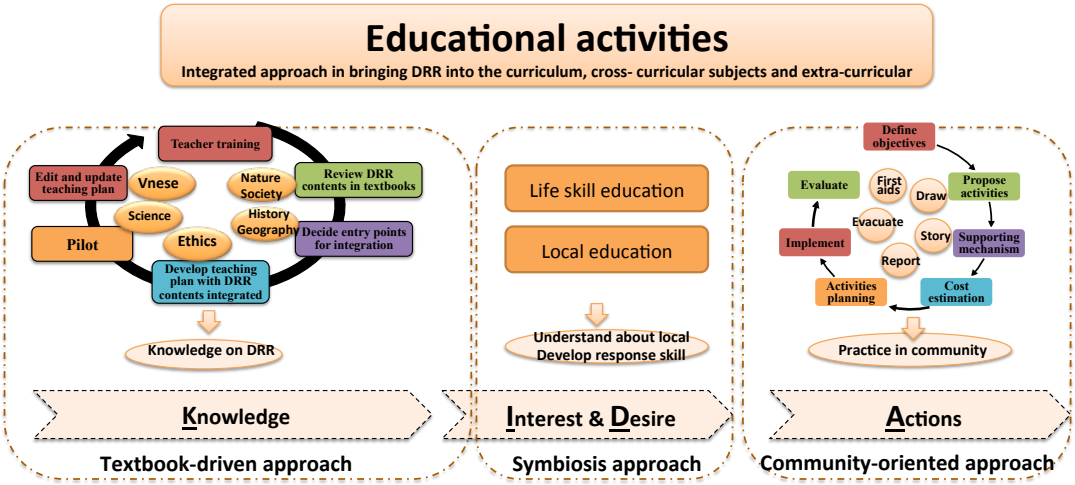

Figure 6.23 Model to integrate DRR into curriculum, cross-curricular subjects and extra-curricular activities

6.4.1 Process to integrate DRR content into curriculum

In Viet Nam, "textbook culture" already exists, thus teachers tend to readily take up the new disaster- related textual material. Textbook-driven approach has its advantages such as there is no challenge to teachers' understanding of their role and little time for teacher to familiarize with the new textbook material. However, it is very questionable whether textbook-base curriculum alone will be able to concretize the skills, attitudes, and behavioral learning outcomes that DRRE targets to. Most of the cases, for example in subjects of Nature or Science, textbooks tend to focus on explaining the causes and effects of natural disasters. It is unlikely to foster active skills and actions of students to prepare and response to disasters. Bonifacio (2010) has also pointed out that a textbook-based classroom culture encourages student passivity and inhibits the active thinking. While interactive and experiential learning is seen as a means of fostering engaged and participatory citizenship (Bonifacio *et al.* 2010). Besides, according to a study on 30 cases studies in DRRE, a centrally driven textbook approach is a 'one-size-fits-all' approach that is insufficiently reflective of and responsive to local cultures and the need to address local hazard conditions (UNESCO and UNICEF 2012). It is therefore necessary to have innovative approaches to support teachers overcome the shortcomings of textual materials and go beyond the wall of textbooks to the practical context where knowledge of students will be nurtured to shape their skills and behaviors in response properly to disasters.

Figure 6.24 shows the basic framework to integrate DRR contents into the curriculum, which include 6 steps as follow:

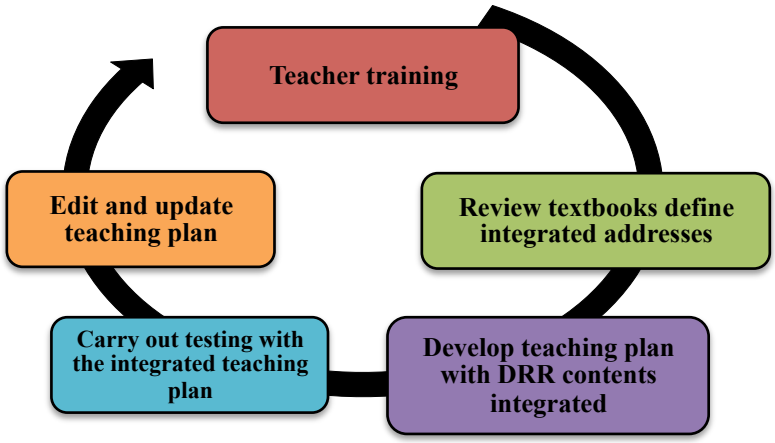

Figure 6.24 The process to integrate DRR into curriculum

- <u>Step 1</u>: *Teacher training*

As mentioned earlier, teacher training is the entry point for the implementation of DRRE. The main objectives of the training are to enhance and change teachers' perception on DRR issues. It will provide teachers with proper knowledge and awareness on DRR so that they can prepare better integrated teaching plan, which in turn will make teachers become active and take lead DRR activities in schools. In this step, the roles of district DoET, NGOs, academia, Health Office as important supporters were pointed out in the stakeholder analysis. As the nature of this research focus on the schools' role in the implementation of DRRE, teacher training therefore will be done by schools. However, it is worth to note here that there are also different types of teacher training on DRR. Shiwaku *et al.* (2007) in the study on disaster education in Nepal proposed two types of teacher training including in-service training provided either by local NGOs or Department of Education (in case of Nepal is NSET-Nepal).

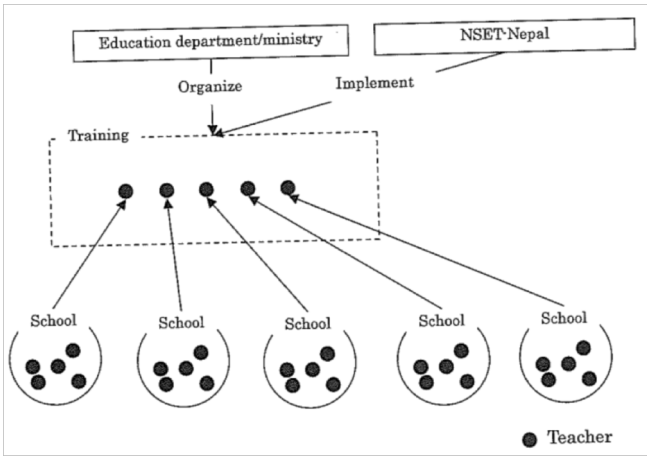

Figure 6.25 Structure of teacher's training (Source: (Shiwaku *et al.* 2007)).

The training is proposed to be carried out annually with participation from teachers of different schools and different teachers are invited for each year (Shiwaku *et al.* 2007). The other type of teacher training is pre-service training provided by University of Education (Figure 6.25). Besides, there are some events or program can be utilized as irregular teacher training on DRR.

- Step 2: ***Review textbook and define the integrated addresses***

The centrally driven-textbook approach often involves curriculum center of the MoET, often working in conjunction with national and international NGOs, in revising textbooks of particular subjects to include, or broaden the pre-existing treatment of, hazard-related or disaster-related topics (UNESCO and UNICEF 2012). However, in this study, as a result from the FDGs, teachers proposed that review of textbook and definition of the integrated addresses should be done by teachers under the direction and supervisor of local DoET, academia and others.

The determination of the integrated address is one of the basic steps toward an effective DRRE. Identifying appropriate address will not only help to avoid overburden students with too much knowledge but also enrich the subjects' contents. A various and comprehensive list of integrated address will allow teachers in different regions adapt their lessons on DRR to the specific local and educational contexts. Later, teachers will be able to accustom the DRR contents according to seasonal alteration and variation of climate change. Definition of integrated address therefore should be considered as a process to set up divergent designs and approaches to implement DRRE. In addition to the assignment of integrated addresses, the level of integration should be decided accordingly. There are three different level as described below:

- Full integration: for lessons with all contents in common with objectives and contents of DRR issues
- Partial integration: for lessons with part of the contents in common with objectives and contents of DRR issues
- Related integration: for lessons with contents related directly or indirectly to the objectives and contents of DRR issues

In order to develop an inclusive list of integrated addresses, the corporations and supports from provincial and local DoET staff, academia, NGOs, and other organizations are crucial.

- Step 3: ***Develop teaching plan with DRR contents integrated***

Based on the identified addresses, teachers develop individual teaching plans, which incorporate the topics of DRR into relevant lessons. In this step, it is essential for teachers to follow the four principals of integrated teaching methodology:

- *Relevance*: the introduction of DRR contents has to fit with the objectives of each education level and the education sector in general. Moreover, it has to be suitable to the cognitive level and ability, and the psychological characteristics of different age groups of students. Impacts of natural disasters are uneven distributed across areas; therefore regional context on DRR is crucial.

- *Diversity and interactivity*: impacts of natural disasters can vary by time and circumstances, therefore teaching and learning contents need to be diverse, not to focus merely on any single type of disasters. It is impossible to deal with any issue or requirement of science and practice without synthesizing knowledge and skills from multiple disciplines and areas. Thus DRR contents needs to be introduced in a broader context so that it can interact, supplement and support relevant topics in different subjects such as climate change, climate change adaptation, environmental education, accident and injury prevention, social skills, and emergency response. This principle will help ensure the sustainability of integrative DRR teaching and learning.

- *Practicality*: teaching DRR need to emphasize local issues and impacts by natural disasters. The practicality of the DRR contents lies in the possibility for students to apply this knowledge and develop practical skills to minimize the impacts of natural disasters.

- *Continuity and update*: teaching DRR has to be planned continuously from primary to secondary, high school, graduate and post-graduate levels. Besides, it is important to have plan to update and adjust the curriculum in accordance with changes in climate change to ensure its effectiveness in helping to minimize natural disaster impacts.

- Step 4: ***Carry out testing with integrated teaching plan***

Pilot is an influential step for teachers to evaluate the accuracy and appropriateness of integrated topics compare to the contents of lessons, the local context, and educational level of students. This step is also important as it stimulate teachers' active efforts on DRRE, offers space for innovation, encourages enthusiastic engagement of both teachers and students toward the ultimate goals of DRRE.

- Step 5: ***Edit and update the integrated teaching plan***

Base on the review and evaluation of the pilot process, integrated teaching plan will be examined and adjusted to make it more practical and flexible. Besides, it is important to plan for regular update on the integrated contents to make it compatible and appropriate with the education system.

6.4.2 Process to integrate DRR into cross-curricular subjects

In this study the integration of DRR into cross-curricular subjects is completed using symbiosis approach. The term symbiosis originates from Ancient Greek, which means "together" and "living". It describes the close and long-term interaction between two or more different biological species. Symbiosis also had been used to depict people living together in community (Douglas 1994). Numerous examples across the globe show the successfulness of the integration DRR into cross-curricular as one measure to overcome the challenge of text-book driven approach as it helps developing social awareness and empowering the students for active citizenship. In a study of UNESCO (2012) on reviewing thirty case studies of the integration DRR, symbiosis approach is one of the dominant approaches being used for cross-curricular subjects. There are 11 among 30 cases studies show the utilization of cross-curricular in the integration of DRR among others (UNESCO and UNICEF 2012). In this approach, a cross-curricular dimension that is already in place acts as a carrier for DRR learning while at the same time is itself enriches. Subjects such as Life Skills, Civic/Citizenship education, environmental education and education for sustainable development are the most popular carriers. In some African countries, DRR is also finding a home within nascent or rapidly developing climate change education programs (UNESCO and UNICEF 2012).

As mentioned before, this study chooses life skill and local education as the two main entry points for the integration of DRR into cross-curricular subjects at primary level.

Integration of DRR into Life Skill Education (life skill education)

This part seeks for a certain of life skills can be used for DRR, which is useful for students at primary level. The following issues needed to be analyzed in order to integrate DRR into life skill education as following:

- Identify skills needed for DRR with the consideration to different target population groups in different regions and localities;

- Link these skills with the existing contents related to DRR in the curriculum in a way that it complements and enriches each other;

- Monitoring and evaluation of quality and impact of life skill education;

The following part will describe in details each steps to complete the integration of DRR into life skill education:

- Step 1: ***Identification of life skills applicable for DRR concept***

Table 6.10 Life skills needed for the school students designed by the MoET

Social skills	Cognitive skills	Emotional coping and self-management skills
Communication skills (Verbal and non-verbal)	Self-awareness	Managing stress
Negotiation and refusal skills	Plan developing	Managing feelings, including anger, worry, and scary
Assertiveness skills	Decision-making	Skills for increasing self-management and self-monitoring (e.g managing time)
Interpersonal skills	Problem-solving	Healthy entertainment
Cooperation skills	Critical thinking	Proper relax
Team working	Creative thinking	Sympathy and tolerance

(Source: MoET, 2013)

The textbooks for life skill education has been approved and issued by MoET through a decision No 1088/KH-BGDDT date 29 Aug 2013. According to this, life skill education is integrated in the subjects of Vietnamese, Ethics, Nature and Society, Science at primary level and the subjects of Literature, Civic Education, and Biology at the secondary level. The life skills that are designed by the MoET for the school students can be divided into three categorized (1) Coping and self-management skills, (2) Cognitive skills, and (3) social skills as in Table 6.10.

Among the skill designed for school students, there are skills that can help students in preparing, response and recovery to natural disasters.

- Emotional coping and self-management skills such as managing stress or managing feelings skills can help students know how to mitigate the miserable, and overcome stresses after disaster. Meanwhile, self-awareness and self-esteem can help to empower students in risk situations and can help students have positive attitudes to manage risks. Also, self-awareness is essential tools for understanding one's strengths and weaknesses. Consequently, the individual is able to discern available

opportunities and prepare to face possible threats. This leads to the development of a social awareness of the concerns of one's family and society. Subsequently, it is possible to identify problems that arise within both the family and society.

- Social skills such as communication with others help students being able to differentiate between hearing and listening and ensuring that messages are transmitted accurately to avoid miscommunication and misinterpretations, especially emergency message.

- Cognitive skills such as critical thinking and creative thinking have been recognized important for increasing children's capacity in response to natural disasters. Besides, decision-making and problem-solving skills can help students overcome the difficulties by disasters and reduce the damages.

According to UNICEF (2010), by addressing these skills across the emergency spectrum (preparedness, response, recovery and development), life skills education can contribute to averting future emergencies as well as promoting individual and community resilience and mitigating impact in the aftermath of an emergency" (UNICEF, 2010). The DRR discourse, particularly adaptation and mitigation, incorporates the growing awareness of environmental threats to agriculture, water and land stability. In this way, interests in environmental management can promote interests in DRRE through life skill education and vice versa (UNICEF, 2012). DRRE takes into account the relationships between society, environment, economy, and culture and their impacts. It also promotes critical thinking and problem-solving as well as social and emotional life skills that are essential to the empowerment of groups threatened or affected by disasters.

Aside from being appropriate with DRR concept, life skill education needs an age-appropriate program. Figure 6.26 proposes a "ladder" of skills for DRR by ages and levels of education.

- **Step 2**: Link the selected skills with contents related to DRR in the curriculum. Table 6.11 presents the relationship between life skills and DRR topics and the connection between selected skills with contents related to DRR in the curriculum. The table includes different specific examples on the content of life skills that can be used for bringing up the DRR related content. For example, according to the curriculum of life skill, the contents of coping and self-managing skills will be taught in the lesson 20, grade 2 of Vietnamese subject. The lesson titled "Mr. Manh fights with the God of the wind" with main contents on how to manage the fear, to mitigate

the miserable, and overcome stresses. When consider to disaster thinking, these skills are extremely helpful as it helps understand the effects and stresses caused by disasters and know-how to overcome fear on disasters. In this way, both the lesson itself will widen its meaning and the DRR related contents will be imparted to students without overburdening. Thus, the symbiosis approach brings a win-win relationship between the main subject, life skill matter as well as DRR contents.

- **Step 3**: Monitoring and evaluation of quality and impact of life skill education for DRR. The methods for assessment of learning outcomes from life skill education for DRR was proposed basically base on the evacuation system for general life skill education. The indicators are knowledge, attitudes, skills and behavior intent. The method used to evaluate these indicators can be done through multiple-choice questions, scalar attitude measurement tools, close-ended questions, role plays and simulations, case study analysis, check lists, etc.

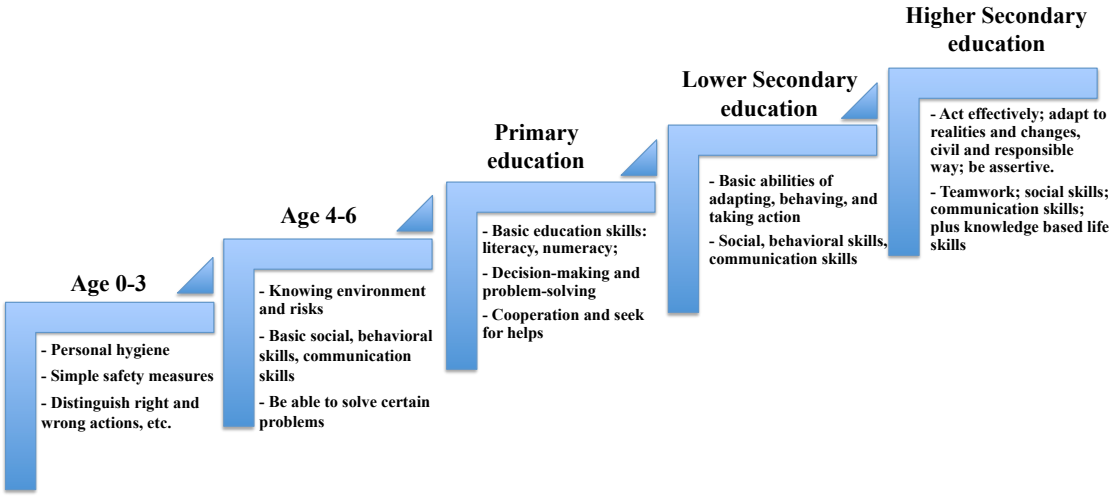

Figure 6.26 Proposed life skills for DRR by ages and levels of education (synthesized by author from different sources)

Table 6.11 Define the linkage between life skills and DRR topics and the link between selected skills with contents related to DRR in the curriculum

General life skills		Life skills linked to DRR topics	Objective(s)	Activities	Examples in the curriculum
Coping and self-managing skills	Managing stress Managing feelings, including anger, worry, and scary	Know how to manage the fear of disaster, to mitigate the miserable, and overcome stresses after disaster	Students understand the effects and stresses caused by disasters and how to reduce the impacts of disaster.	- Think appropriate ways to overcome fear of disaster	Vietnamese, grade 2, lesson 20 "Mr. Manh fights with the God of the wind"
	Skills for increasing self-management and self-monitoring (e.g managing time)	Study of self-management skills on DRR	Understanding of the importance of family meeting on DRR before disaster and family reunification after disasters	- Organize family meeting - Sharing/remembering experiences of disaster with family members - Ask each family member what to do before/during/after disasters - Thinking of prevention/ preparedness/ recovery way with family	- Vietnamese, grade 3, lesson 4 "Family"
	Sympathy and tolerance	Study on how to be sympathy, tolerance, and help each other in disasters	Understanding how people are alike and how we differ, and learning to appreciate and help people	- Help people who affected by disasters through raising money, books, notebooks, etc.	Ethics, grade 4, lesson 12 "Actively participate in humanitarians activities"
Cognitive skills	Self-awareness	Self-awareness can help to empower students in risk situations and can help students have positive attitudes to manage risks.	For students to understand own strengths and weaknesses, as well as own responsibilities so that students will be able to discern available opportunities and prepare to face possible threats	-	Ethics, grade 5, lesson 2 "Responsible for your work"
	Decision-making	Study on step of how to do decision-making about important plan or actions to response to disaster	Students overcome the difficulties by disasters and reduce the damages.		- Science, grade 4, lesson 38 "Light winds, strong winds, typhoon prevention and response"
	Problem-solving	Generating solutions for mitigation/prevention of the impacts of disaster or solutions to difficult problems in time of disaster	Understanding on basic step for DRR related problem solving	- Think about the problems caused by human activities or problems can be faced during a disaster	- Science, grade 5, lesson 65-69 "Human impacts on environment"

				- Propose relevant solutions for each circumstance	
	Critical thinking	Learning the basic process in critical thinking and make objective judgments about choices and risks	Understandings how to make choice of what should or should not to prevent/mitigate/reducing disaster risk	- List all the possible actions before/ during/ after disaster - Categorize actions into list of should or should not	-Science, grade 4, lesson 17 "Prevent drowning accidents" - Vietnamese, grade 4, lesson 27, "Heroes"
	Creative thinking	Generate new ideas about how to mitigate/prevent or reduce the impacts of disaster. Orient creative thinking to actions adapting to changing circumstance			Science, grade 4, lesson 29, "Water saving"
Social skills	Communication skills (Verbal and non-verbal)	Learning how to communicate with others in time of emergency	Understanding of how to differentiate between hearing and listening and ensuring that messages are transmitted accurately to avoid miscommunication and misinterpretations, especially emergency message		Vietnamese, grade 3, lesson 7 "Community"
	Cooperation skills	Study how to cope with disaster in cooperation with community	Student can understand that cooperation with community can mitigate disaster damage		Ethics, grade 5, lesson 8 "Cooperation with people"
	Listening to others	Listen to indigenous DRR legend/superstition born in indigenous place	Understand indigenous DRR legend/superstition	Find persons who are familiar with disaster legend (e.g. Elderly people such as grandmother/grandfather/ head of village) and ask for their knowledge on disaster. (e.g. Dragonfly story/ frog story) Collect, study and share DRR legend/ superstition to classmates.	Vietnamese, grade 1, lesson 60 "ieu" Vietnamese, grade 1, lesson 85 "uon"

Local education

Integration of DRR into local education needs to focus on the significance of locality (e.g., different types of hazards in different regions) and local knowledge on how to cope with disasters. The objective of teaching DRR in local education is to strengthen local knowledge of students on the issues related to DRR, at the same time give students opportunities to work with local community while searching for information on local DRR. This method requires teachers to collect data, investigate actual events and situations, in order for students to learn about the local context and learn how to properly response base on local conditions. Therefore, teachers should explore actual local situations and use that information in their teaching for practicality and effectiveness. Some potential contents for the integration of DRR in the local education: types of disasters occur in local areas, maps of important places (risk place, evacuation places, location of nearest hospital, police office, etc.), relationships and roles of each DRR stakeholders in local community, among others.

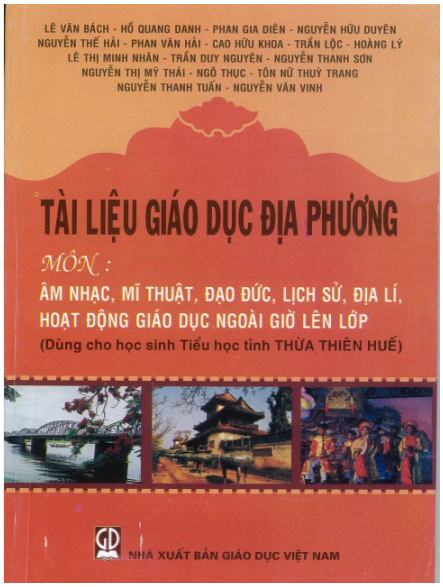

Figure 6.27 Book “Local education in primary education” (Source: Hue DoET, 2008)

The following part will examine on where (integrated addresses) and what (contents) to integrate the DRR into the local education in the subjects of Ethics, Geography and Arts. As from the result of textbook review, there are some address that can be used to promote local education such as lesson 13 and 14 (grade 4), lesson 8, 10, 13, and 14 (grade 5) (Figure 6.27). In Geography, local education can be integrated into the local geography lessons such as lesson 27 “Hue City” (grade 4), and lesson 28 “Da Nang City” (grade 4). Table 6.12 provides some examples on the address and the contents to integrate DRR into local education in the subjects of Ethics, Geography and Arts.

Table 6.12 Integration of DRR into the local education the Ethics, Geography and Arts at primary education

Subjects	Grade	Lessons	Title	Lesson contents	Local education on DRR
Ethics	Grade 4	11	Maintain the public construction	Understand the role of public construction, especially in time of disaster such as flood and typhoon	Study the location of important places such as evacuation, hospital, police, etc.
		12	Actively participate in humanitarian activities	When flood occurs, it is important to help each other during and after the flood	Study about the humanitarian activities available in the local community and actively participate
		13	Understanding about NGOs	The role of NGOs including support for DRR	Study about the NGOs working in the local areas and their roles in local DRR
		14	Environmental protection	Environmental protection and its link to natural disasters mitigation	Study about the local knowledge applying for activities on environmental protections as well as disaster mitigation/prevention
	Grade 5	8	Cooperation with people	Cooperation with local people and know how to call for help in the emergency situation	Study to cope with disaster in cooperation with local community
		10	Local People's Committee	Understand about the Local People's Committee	Study about the role of local People's Committee in managing disaster issues
		13	Understanding about UN	The role of UN bodies including support for DRR	Study about the activities of UN organization in the local areas and their contribution to the DRR activities
		14	Protection of natural resources	The role of natural resources and effective use of natural resources	Study about the activities of local people that have impacts on the natural resources and causes natural disasters such as flood, erosions, etc.
Geography	Grade 4	3	Production activities of the people in the Hoang Lien Son	Cause of flash flood (deforestation)	This part is "Dia ly dia phuong" (local geography), its contents focus on explaining the local natural and socio-economic conditions. This gives a lot of space for the integration of local knowledge on DRR. Depending on the location of schools, the teacher can choose the appropriate lessons as address to integrate knowledge on DRR, for example, schools in Hue will may choose the lesson 26 "Hue City" to teach about DRR in the local education, or in case of Da Nang City, the lesson 28 "Da Nang City" can be the best fit.
		4	The Northern Midlands	The impacts of deforestation and slash and burn and the cause of floods	
		5	Highlands	Flood in highlands	
		11	Northern plain	Mitigation measure of flood using dam system	
		15	Hanoi Capital	Floods occur more frequent in Hanoi	
		16	Hai Phong City	Typhoon and its impacts in coastal cities	
		17	Southern plain	Flood and cause of flood in low-land areas	
		22	Can Tho City	Living with flood	
		24	Central coastal plain	Impact of flood and typhoon	
		27	Hue City		
		28	Da Nang City		
		29	Sea, Island and Islands	Impacts of tropical storms, typhoons and sea level rise	
	Grade 5	3	Impacts of climate	Causes and impacts of flood, typhoon and drought	
		4	Rivers	Cause of river flooding	
		5	Coastal areas	Impacts of typhoon in the coastal areas	
		6	Land and forest	Typhoon, flood and sand intrusion. Role of forest, especially mangrove forest in mitigating damages from typhoon and flood	
Music					Draw pictures of disasters and how local people cope with disasters

6.4.3 Process to integrate DRR into extra-curricular

Extra-curricular activities in primary school in Viet Nam are decided by school principal base on the availability of resources and the needs as well as the interests of students. It requires careful planning, linking, and complementing the contents in school curriculum. Integration of DRR into the extra-curricular, therefore, should be carried out in an effective manner with careful selection of proper activities and cost estimation as well as implementation mechanism, in particular for outreach activities from school to community. The main objectives of integration of DRR into extra-curricular are:

- to supplement existing integrated knowledge on DRR without duplicating them
- to give students chance to practice the skills on DRR (from the LSE program)
- to create opportunities for students to work with local community and strengthen DRR knowledge on local context
- to link knowledge on disaster to appropriate actions on DRR in practice

However, different types of extra-curricular aim to formulate different types of actions on DRR, therefore, definition of specific objectives is essential before selection of activities. The steps to integrate DRR into extra-curricular are described as in Figure 6.28, which includes 7 basic steps: (1) define objectives or the achievement/actions that students will be able to attain/practice on DRR; (2) select the extra-curricular activities that best fit with the mentioned objectives and link to the integrated knowledge on DRR in the curriculum; (3) identify what kind of support (both technical and logistics) that teachers need to be able to implement the selected activities; (4) estimate the cost for preparation and implementation of the activities; (5) planning for the activities with development of the activities' content and defined role of teachers and students; (6) Implementing; (7) Evaluating and monitoring.

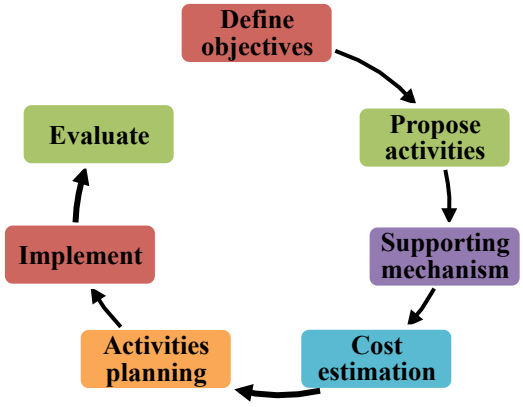

Figure 6.28 Steps to integrate DRR into extra-curricular

From the results of questionnaire survey and review of textbooks, the study propose ten activities to be used for teaching DRR in the extra-curricular at primary level, namely: Drawing competition, Hazard mapping, Town watching, First aid and task, Evacuation drill, Newspaper reading and making, Story show, Essay contest, and Emergency bag. Basically, these activities are divided into two type of extra-curricular base on their goals as to (1) strengthen practical knowledge on DRR and (2) perform actions on DRR.

The first category includes activities such as newspaper reading/making, drawing competition, story show, and essay contest, among others. Engaging in these activities give students opportunities to share, argue and express their opinions in different DRR topics. Making newspaper, for example, requires students to search for the local knowledge and experiences on disasters occur in the local areas; story show can help to develop and form students' attitudes and opinions on DRR issues; with report writing or essay contest, students' knowledge can be strengthened; reading newspaper and information from different media can help students understand the actual damages, from that raising their awareness and sense of responsibility in disaster response actions. The secondary category includes activities such as hazard mapping, town watching, first aid and tasks, evacuation drill, etc. These activities help expand students' practical knowledge and develop their skills in observing, recognizing and identifying disaster risks, which help to develop their own responsive measures. Table 6.13 provides some examples on the extra-curricular activities on DRR in the primary education program, and how it links to the integrated knowledge on DRR in the curriculum.

Table 6.13 Examples on the integration of DRR contents into some extra-curricular activities

Objectives	**Activities**	**Contents**	**Student activities**	**Link to curriculum contents**
Understanding on the phenomena of disasters through visual tools (video, pictures, newspapers, etc) and know how to collect different types of information on disasters and DRR	Newspaper	Reading newspaper, report and make newspaper	- Collect and read articles describing disasters and damages caused by disasters. (e.g. Lose house or family, lose health such as catch cold/ Have diarrhea/ Injured) - Making school newspaper base on the information collecting from activities: + *Before disasters* such as daily notice on rainfall and temperature, listen to indigenous DRR legend/superstition and making report, making disaster calendar, etc. + *After disasters* such as study damages by disasters on health (e.g. Diarrhea by drinking dirty water/ Diseases in unsanitary situation); impacts by disasters on safety (e.g. Spend anxious night in darkness/ Feel insecure due to no house). Think what to inform by considering above-mentioned matters	Vietnamese, grade 1, lesson 60 and 85; grade 2, lesson 20; grade 3, lesson 4 and 7; grade 4, lesson 27; grade 5, lesson 9 and 11 Nature and Science, grade 1, lesson 33; grade 3 lesson 50 and 65 Geography, local geography
	Drawing competition	Draw picture of disaster occurring in the community	- Remember/Imagine disaster impacts at home/ school/community (e.g. Building shaken/window glass broken/ health related problems) - Express disaster impacts on paper (e.g. Picture of collapsed house/tree fallen down/scared face) - Discuss prevention methods against disaster impacts after drawing (e.g. Provide drinking water & medicine/ strengthen building)	Arts Geography, local geography
	Story show	Watch picture story show and consider what to do before disaster striking	- Watch picture story show on DRR (e.g. Three little pigs against storm/ Legend of dragonfly against typhoon) - Find out problems in picture-story show (e.g. because of no effort to build house/ because of no listening to others on DRR) - Discuss how to solve above-found problems. (e.g. Need to make much effort to build house/ Have to listen to other's advice) - Learn concrete actions to cope with disaster (e.g. Strengthen house/ Cooperate with community)	Science, grade 4, lesson 38 Geography, local geography
	Essay contest	Write an essay on disasters which students experienced/imagine	- Remember/Imagine/interview family member/local people about what happen in a disaster at home/ school/community - Write an essay describe disasters and damages (e.g. Building shaken/window glass broken/health related problems)	Vietnamese, grade 1, lesson 60 and 85; grade 2, lesson 20; grade 3, lesson 4 and 7; grade 4, lesson 27; grade 5,

			- Discuss prevention/mitigation method against disaster after essay writing (e.g. Find evacuation route/ Provide drinking water & medicine/ strengthen building)	lesson 9 and 11 Geography, local geography
Performing actions on how to mitigate/prevent disaster risks	School walking and hazard mapping	Find evacuation route and safe/dangerous places in school	- Walk inside and outside (surrounding place) of school site - Draw and memorize map of school site (e.g. evacuation route, vulnerable/safe places during emergency/disaster) - Mapping location of school facilities (staff room/ kitchen/ infirmary etc.) with their roles.	Nature and Science, grade 2, lesson 18 Geography, local geography part
	Town watching	Find evacuation route and safe/dangerous places in the local area	- Notice usefulness of knowing vulnerable/safe place for evacuation. (e.g. Higher place at flood and tsunami/Strong building for evacuation at storm) - Conduct town watching with teachers and parents. (e.g. By bicycle/car/motor-bike) - Check safe/vulnerable place against disaster. (e.g. River/pond/road under construction/higher place) - Mapping vulnerable/safe place - Mapping evacuation place and route (e.g. Safe place away from water source for heavy rain/ Higher place for tsunami)	Nature and Science, grade 2, lesson 13; grade 3, lesson 36 Geography, local geography part
Performing actions on how to prepare and response during emergency/disasters	Emergency bag	Prepare emergency bag and study how to use it in time of disasters	- Think of items need for emergency/disaster situation (e.g. water, canned food, emergency goods, flashlight, etc.), consider items for helping injured people (e.g. bandages, medicine, etc.) - Practice how to use each of items in emergency situtation	Science, grade 4, lesson 38
Performing actions on how to response during emergency/disasters	First aid and task	Practice first aid and tasks	- Imagine situations of injury by disaster (e.g. Cut hand by glass fragment/ Pressed under heavy furniture) - Learn and practice first aid skills with medical staff in schools or staff of local Red Cross (e.g. How to put bandage/How to treat fracture) - Share first aid skills with family/community members	Science, grade 4, lesson 17
	Evacuation drill	Practice evacuation drill following teachers' directions	- Learn evacuation route and place from teachers - Follow teachers' guide and practice safely and timely evacuate - Practice evacuation together with local community	Science, grade 1, lesson 20; grade 4, lesson 38 Ethics, grade 5, lesson 8 Geography, local geography part

(Source: adopted from SEEDS Asia (2013))

6.5 Key findings

Integration of DRR content into teaching and learning activities remains as a challenge for DRRE in Central Viet Nam. Results show both advantages and disadvantages on the implementation of DRRE.

First, teacher perception assessment illustrates the most concerns on DRR training and awareness raising activities, in particular teacher training. The highest important level of teacher training rated among 20 prioritized actions has strong basis for teacher training should be treated as the beginning point for the integration of DRR into teaching and learning activities in schools. However, as found in Chapter 5 that those activities related to training on DRR were classified as medium-term action as a result of limited capacity of school. Therefore, addressing the teachers' needs on DRR training is a challenged task.

Second, the majority of investigated teachers experienced teaching about disaster issues mentioned literally in textbooks. This creates opportunities for application of textbook-driven approach in bringing DRR into teaching and learning activities, especially in the beginning phase of the process. However, a textbook-based classroom culture often makes student passivity and hinders the interactive learning. The textbook-based teaching method will add more work to teachers and overburden students with huge knowledge, yet not enough to provide students with a comprehensive understanding on DRR.

Third, the level of integration DRR is little and inadequate. Among the given reasons, the lack of materials was seen as crucial problems. In fact, there are abundant materials on DRR as well as other related topic such as climate change, environmental change, environmental protection, etc. However, the national curriculum and national textbook system have limit teachers in the content of the textbook, which is treated as the sole reference for teaching and learning in schools. As a result, the limited resources on DRR in textbooks are inadequate to equip teachers and students with proper knowledge, which inhibits the level of integration of DRR into educational activities. To solve this problem, not only curriculum and textbook need to be reviewed and revised, but also larger distribution of available materials and resources on DRR are needed. Besides, teacher training on how to utilize various reference resources on DRR in better develop integrated teaching plan can be considered as applicable solution in the current situation.

In order to overcome identified challenges, the research has developed a model to integrate DRR related contents through curriculum, cross-curriculum subjects and extra-curricular activities. The basis of this model is KIDA concept. It highlights the importance of

knowledge as nutrient supplies to growth up students and teachers' desire and interest of the DRR issues, which is crucial for the development of proper actions response to disasters. As such, the model has the potential to navigate the current issues as it utilizes the traditional educational approach in Vietnam (national curriculum and textbook approach), at the same time employs the LE and LSE subjects and extra-curricular activities to improve the external relationship of school with community and other stakeholders. The innovative characteristics of this model lie in the fact that it allows enough space for school to modify and adapt to the general education program base on its actual needs on DRR. Examples on the integration of DRR into the curriculum, cross-curricular subjects and extra-curricular activities at primary level is given in Appendix 10.

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Chapter 7 Discussions

This chapter presents the summary of key findings from the previous chapters and the main challenges of DRRE practices are pointed out. This helps in establishing the framework for building educational resilience using school-based DRRE approach. The employment of school-based approach in the context of Central Vietnam is described in step by step including planning, implementation, monitoring and replication.

Contents

DISCUSSIONS

7.1 Key findings

Key finding from the earlier chapters are presented in this part to provide inputs for strategies on school-based DRRE aiming to strengthening resilience in the education sector.

Chapter 2 has reviewed the literature on the concept of resilience and look through educational resilience in the context of disaster. The findings help to formulate a framework on building educational resilience to disaster, whereby improvement of educational governance and education activities are crucial. In the quest for appropriate approach to DRRE, the school-based DRRE is viewed prominent over other for many factors such as continuity, sustained and follow-up. School-based DRRE approach is characterized as: (i) leading by a functioning group in the school while the activities should go beyond the school wall; (ii) school DRRE should include every single stakeholder who may be affected by disaster, and anyone whose opinions and decisions affect DRRE practice; (iii) education and training programs should be designed in such a way that they are sustainable and continuous processes as the target population continuously changes and grows; (iv) school DRRE should be considered as a key pillar of public DRRE to enhance community disaster resilience, gain support for school-led activities, and motivate local resources for risk mitigation and planning in school.

Chapter 3 provides a status of DRRE in Vietnam. Currently, although Vietnam has made commitment on the implementation of DRRE from the year 2011, there does not exist a type of official DRRE in Vietnam. However, initiatives on DRRE have been carried out by NGOs and different organization in Vietnam from decade ago. Together with the release of the Action plan of Education sector on disaster prevention, preparedness and response, the DRRE has been put as one priority among different types of education such as Environmental Education (EE), Climate Change Education (CCE) and Education for Sustainable Development (ESD). Follow the national education system, the educational programs are mainly managed at central

level, which pose challenges for the implementation of DRRE at local or school level. Therefore, for a better translation of DRRE related policies at local level, the specific guidelines on DRRE are needed to reduce variation amongst regions. Consistency between DRRE policy and relevant policies at different levels helps to ensure the local work in track with the national guidelines. Authoritative support especially from local government and community is critical for an effective DRRE.

In Chapter 4, the school disaster resilience assessment (SDRA) was used to measure the current resilience level of primary schools in the Central Vietnam. The resilience analysis shows the variations among the implementation of DRRE, which resulted in different resilient level between regions. This has important implications on the need for case specific approaches in addressing DRRE differently base on the local context. The case study of rural schools in Da Nang City highlights the highest resilience of physical conditions, human resources, institutional issues and external relationships, whereas lowest in natural conditions. This proves that educational resilience can be built base on the improvement of school capacity on physical conditions, human resources, institutional issues and external relationships. Analysis the strategies of rural schools in Da Nang City has illustrated a focus on some key aspects of different aspects. For example, to improve human resources, the foci are on enhance teacher capacity through teacher training; for institutional issues, integration of disaster risk reduction into school curriculum, development of disaster risk reduction materials and set up earlier warning system in schools are highlighted; to improve external relationships, the schools has established a strong relationship between school and community, simultaneously strengthened schools' capability to be used as evacuation for community. As a result, despite the limited financial supports from outsources and severe impacts of disasters such as typhoons, salinity, and heat waves, the rural schools in Da Nang City show the highest level of resilience to disasters among regions. The results from the two-year analysis (2011-2013) of SDRA in urban schools in Hue City also stressed on the highest and also the most important contribution of Human resources and Institutional issues. Training for teachers, students, as well as involvement of parents in disaster risk reduction activities need to be enhanced through development of school strategies but also through teaching and learning activities in schools. Compare to the quickly change of human resource, particular teachers' factor, the external relationships are difficult to be improved, thus focus on reinforcement of external relationships are also crucial for

the increase of educational resilience. There is a need for a strategy to manage the relationship between school and community, to prevent the downward trend of this factor in the face of urbanization and development.

Chapter 5 described the process to create the list of educational disaster resilience actions, as well as to develop the action plan on disaster risk reduction in a participatory manner. At first, 51 educational disaster resilience actions were proposed base on the framework of SDRA through focus group discussions with participation of DoET staff, school principals and school teachers. Then stakeholder analysis was carried out to understand different role of stakeholders in the implementation of DRRE in school. Results show that the leading role of teachers was identified for most of the actions. DoET staff and local government were considered as the two most important supporters for the practice of DRRE. Simultaneously, time schedule for completing each action was defined using the scale of short term (2 years), medium term (from 2 to 5 years) and long term (more than 5 years). There are 42 actions in Hue Province and 49 out of the total of 51 actions expect to be accomplished within the period of 2 years (short-term). Prioritizing the top 20 actions that need for facilitate DRRE shows that both in Hue Province and Da Nang City, actions aiming to improve Human resources and Institutional issues are strongly focused. This finding was again confirmed when studied about the implementing mechanism for these 20 actions in specific schools, especially in rural school of Da Nang City. For examples, rural school in Da Nang City (Hoa Khuong primary school) has set up the regular check for school buildings by cooperating with local government, local DoET, experts/NGOs, and local community. The school has given a very strong suggestion to these stakeholders to include the actions into their annual action plan to sustain the action. In general, it can be assumed from the interview of rural school in Da Nang City that the school strategies on DRRE focus on encouraging the leading role of teachers and students whenever relevant, as well as the involvement of parents and cooperation with other organizations.

Chapter 6 investigates experiences and needs of teachers in the implementation of disaster resilience actions in schools, as well as teaching and learning activities related to DRRE. Results show that the majority of teachers experienced teaching DRRE, in particular in the subjects of Vietnamese, Ethics, Science and Nature (for grade 1, 2, and 3) and Vietnamese, Geography and History (for grade 4 and 5). This creates an opportunity for the textbook-driven approach to be applied in the context of Vietnam,

especially in the beginning phase of DRRE. Results from reviewing the textbooks of all subjects of the primary level show that the disaster risk reduction related issues exist in the current curriculum, yet insufficient for students to perform actions. The most challenge for teaching DRRE is that since the curriculum in Vietnam is centrally controlled, the localization, which is crucial for learning DRRE, is thus neglected. Local education, life skill education and extra-curricular activities were found as potential addresses to resolve the problems. While local education provides students chance to understand about natural disasters in the local context, life skill education equips students with necessary skill to response to disaster and reducing damages. However, there is an obstacle that life skill education is still under national control and local education are provincially control whereby the content is not yet enough to satisfy the variation of students' characters, teachers' ability, schools' strategies, or of local socio-cultural conditions, in particular specific educational context. For example, there are different types of disasters associated by different topography and weather in Hue Province, yet the content of local education are generalized for mountainous, coastal and plain alike in the province. At the end, the chapter proposed that a focus on extra-curricular activities, which are decided by schools, is important to overcome existing bottlenecks, also contribute to strengthen the relationship between school and community.

7.2 Challenges for the implementation of DRRE

The research found five main challenges to the implementation of DRRE in Vietnam: (1) impacts of new risks associated with natural disasters and changing climate; (2) policy and practice gaps; (3) variation of disaster risk reduction practices; (4) reduction of external relationship between school and community under pressure of development, and (5) limitations of DRREal activities under current circumstance.

Impacts of new risks associated with natural disasters and changing climate

Education sector in Vietnam has been severely damaged by natural disaster, especially impacts of floods and typhoons. Floodwater submerged school buildings and gradually destroyed the structure of school. Typhoon causes destructive damages to roofs, windows, fences, gate of schools and other common services in schools. In addition to structural damages, impacts of natural disasters on school facilities such as

learning table and chair, books, notebooks, computers, etc. also contribute largely to break down educational continuity. Indirectly damages on human health and reduced educational quality add to the vulnerability of both educational and socio-economic system and further increasing disaster losses.

Evidences from recent studies suggest that flood disaster in Vietnam is not only a "pure hazard-led disaster", but also has origin in social vulnerabilities (Shaw 2006, Tran *et al.* 2010), and that "people do not learn from flood disaster" (Schad *et al.* 2012). Failure in dam management is another manmade disaster, which accelerates the flood situation in Central Vietnam. Heavy rains caused by tropical depression combined with water discharge from local hydropower dams were reported to occur annually in Central Vietnam. Such kind of flood submerged a rural village in Quang Nam Province's Dien Ban District on November 17 2013 and killed 41 people, injured 74 in the Central and Central Highlands regions. According to the Center for Flood and Storm Prevention and Control, on 16th November 2013, 9 out of the 15 dams discharged huge amounts of water - from 600 to 2,500 cubic meters per second. However, local authorities did not recognize this failure but continued to blame heavy rains triggered by a tropical depression as major cause of the flood. Findings from these facts point to a tendency of raising people's awareness, building culture of safety upon providing knowledge, rather than calling for costly structural construction, as was often seen in the past (Miletti 1999, Wisner *et al.* 2004, Schad *et al.* 2012).

Shaw *et al.* (2011) in a study on disaster education has suggested that depending on the nature of disasters within the local context, the DRRE approach should be variation. While hydro-meteorologic disasters such as floods and typhoons have different dimensions related to early warning and risk communication, approach of DRRE to earthquake involves effective preparedness (Shaw *et al.* 2011). Compare to other types of disasters, earthquake disaster education requires more attention Shaw *et al.* (2004). Recently, observation on minnor earthquakes with magnitude less than 7 on the Richter scale was reported in Vietnam. More than 20 earthquakes have struck central part of Vietnam within one month in September 2012 ("Recent Earthquakes Trigger Mixed Opinions", Vietnam News, accessed December 1st 2013). This new risk requires DRRE in Vietnam with multi-approach and calling for further localization of DRRE.

Policy and practice gaps

Analysis on educational and disaster risk reduction policies shows a huge gap between policy and practices exists as main barrier for the implementation of DRRE. Despite the fact that DRRE has been recognized and set as priorities in the National strategy for natural disaster prevention, response and mitigation in 2007 and the National action plan on education for disaster risk reduction has been set up four years later in 2011, there are gaps between policies and actions at different levels due to centrally controlled curriculum, lack of consistency between disaster risk reduction related policy, and lack of proper mainstreaming of DRRE policies into local socio-economic strategies in general and into educational development in particular.

Under the centralized management structure, each level of the education system is subject to a different degree of central control over the curriculum. The primary school and secondary school curricula are national and compulsory. The number of hours, curriculum content and textbooks are dictated by the MoET. Central control over the curriculum consequently enforces common practices and standards across the whole system, and is associated with the adoption of a national system of qualifications. This has negative impacts on the promotion of DRRE as it hinders the adaption of the disaster risk reduction related contents in the local context, ignore the variation between different geographical and socio-economic conditions, as well as the actual needs of schools, which resulted in overburdening students and limit the flexibility of DRRE programs. In higher education, the undergraduate and postgraduate curricula also follow the uniform frameworks set by the MOET, which determine the total number of credits and the percentage of core courses, required courses and specialized courses for each field of study. Control is centralized particularly in respect of required courses, in terms of the number of hours and the teaching content. As a result, this causes constraint to the pre-service teacher training on disaster risk reduction, at the same time limiting the ability of teachers in carrying out DRRE within the specific context.

As clearly defined in the DRRE policy that DRRE should origin from environmental education and contribute to climate change education in achieving education for sustainable development (in Chapter 3, session 3.2), but that linking between DRRE and other types are lacked out in the implementation of DRRE. There are both complementariness and conflicts between the application of environmental education, DRRE, climate change education and education for sustainable

development. Similarity can be seen through the approach to these types of education whereby the advance of curricular, extra-curricular, textbook, reference materials and tools for teaching and learning in environmental education, DRRE, climate change education, and education for sustainable development is employed at all levels. Besides, building capacity for educational staff, educators, teachers and lectures is considered as an indispensable part of these programs. Differences between these four are also recorded as the main challenges for the practice of DRRE. For example, the role of science and technology education which is highlighted in larger national policies as to promote scientific and technological activities to establish the scientific and practical basis has been reflected only in environmental education and climate change education yet absent in DRRE. Simultaneously, while one of the main thrusts for education for sustainable development is boosting and improving basic education and reorient existing curricula, the climate change education and DRRE follows a strategy to mainstream climate change and disaster issues within the current education and training system.

Furthermore, while there is a growing concern among stakeholders about DRRE, incorporating DRRE into educational as well as socio-economic development is not yet standard practice. In particular at the local level, promotion of DRRE in the overall planning process has not been recognized. It is only in some of the projects supported by NGOs, where DRRE has been implemented as part of extra-curricular activities or in school special events. In order to achieve a comprehensive approach on DRRE at school level, this integration is of extreme importance. It helps to ensure that the practice of DRRE goes in line with other educational activities and in a sustained manner. Besides, assimilation risk reduction initiatives into existing development plan or relief and rehabilitation programs is one way to reduce variation in the disaster risk reduction practices (Sharma 2005). Shaw *et al.* (2011) agreed that disaster risk reduction is indispensable part of developmental domain and it calls for a change to safer development. However, it is noted that the process of integration not only requires more investment from education sector but also inclusive efforts from the whole society.

Variation of DRRE practices in Central Vietnam

Third, variation in the implementation of disaster risk reduction in the education sector was seen among urban and rural regions in Hue Province and Da Nang City.

While the SDRA in Hue Province evidences the lower resilience of rural areas compare to urban areas, Da Nang have higher resilience of rural schools than urban schools. In Hue city, the schools located in higher elevation were seen to have better resilience. Mountainous schools in Da Nang City recorded a better score compare to those in coastal areas, and even among coastal schools, there was a reduced score proportion to school location's vicinity to the coastal line. These variations cause difficulties for policy-making, which requires the decision-makers to understand the cumulative effects of specific educational system, as well as local socio-economic context to be able to create progressive reinforcements for enhancing resilience from school level. Furthermore, result from variations among schools' resiliency provide important inputs for the establishment of school-based approach to DRRE, whereby understanding of school's strengths and weaknesses is indispensable in planning and formulation of appropriate strategies and actions at school level.

Reduced external relationship under pressure of development

Results of the change in school disaster resilience in urban areas in Hue Province after two years proved that the *External relationship* dimension, especially the relationship between school and community have tendency to reduce while other aspects have been improved. One of the reasons is due to the change of many schools' locations and rebuilt of school in new places, which improved the *Physical condition* and *Natural condition* dimensions of schools, yet simultaneously break down the relationship between schools and communities. Besides, in a broader context, the wisdom and social institutions of communities to cope with traditional risk, which is very important for building educational resilience, have been broken down in many areas. Together with the shift from collective management to the market-oriented management, social capital such as cohesion or bonding has been gradually reduced due to the rapid processes of urbanization and privatization.

Limited integration of disaster risk reduction into teaching and learning activities

Teacher training and integration of disaster risk reduction into teaching and learning activities remain as challenges for the practice of DRRE. In Vietnam, the teacher-centered method, which encourages passive study habits among learners, is still prominent. Result from school disaster resilience assessment at primary level in

Hue Province and Da Nang City has proved that although there is a large number of students and teachers reported as qualified and equipped with proper knowledge on disaster risk reduction, the number of teachers and students impacted by disasters is still high. This highlights the failure of DRRE in bringing knowledge into actions so that teachers and students can response properly and reducing damages by disasters. Analysis the curriculum and extra-curricular activities in this study shows that there is a deficiency in disaster risk reduction related contents in textbooks as well as extra-curricular activities.

7.3 Towards a school-based approach in DRRE

From the key findings of school resilience assessment and teachers' assessment in Central Vietnam, the study proposes framework to promote DRRE should include different activities and approaches in facilitating governance and educational activities. The framework was built up on the concept of educational resilience, school safety, "Knowledge-Interest-Desire-Action" (KIDA) model, and different approaches including textbook driven approach, symbiosis approach, and community-oriented approach (Figure 7.1). The involvement of various stakeholders from school teachers and students, educational staff, local government, local community, NGOs, Health Center, and other organizations are emphasized. As the two identified components of the framework are led by school teachers and students, a school-based approach is crucial for the implementation of DRRE. The main objective of the school-based DRRE is to optimize the use of both internal and external school resources in effective way to minimize and reduce negative impacts of natural disasters, and contribute to the enhanced resilience for the education sector and for the community as a whole.

7.3.1 Good educational governance

Good governance is one important aspect of building educational resilience, which helps to establish the legal basis and constitutionalize DRRE. The four foci of a good educational governance including school safety measures, strengthening relationship with community, teacher training and integration of disaster risk reduction into teaching and learning activities. The implementation of disaster risk reduction education will comprises different aspects from (i) improving physical conditions in school through application of building codes, regular check; (ii)

enhancing human resources' capacity through teacher training, as an entry point for student training and awareness raising for family and community; (iii) establishing institutional basis including development of plan on disaster preparedness, response and recovery, integration of disaster risk reduction education into teaching and learning activities; (iv) fostering (external) relationship between school and community and school with local government.

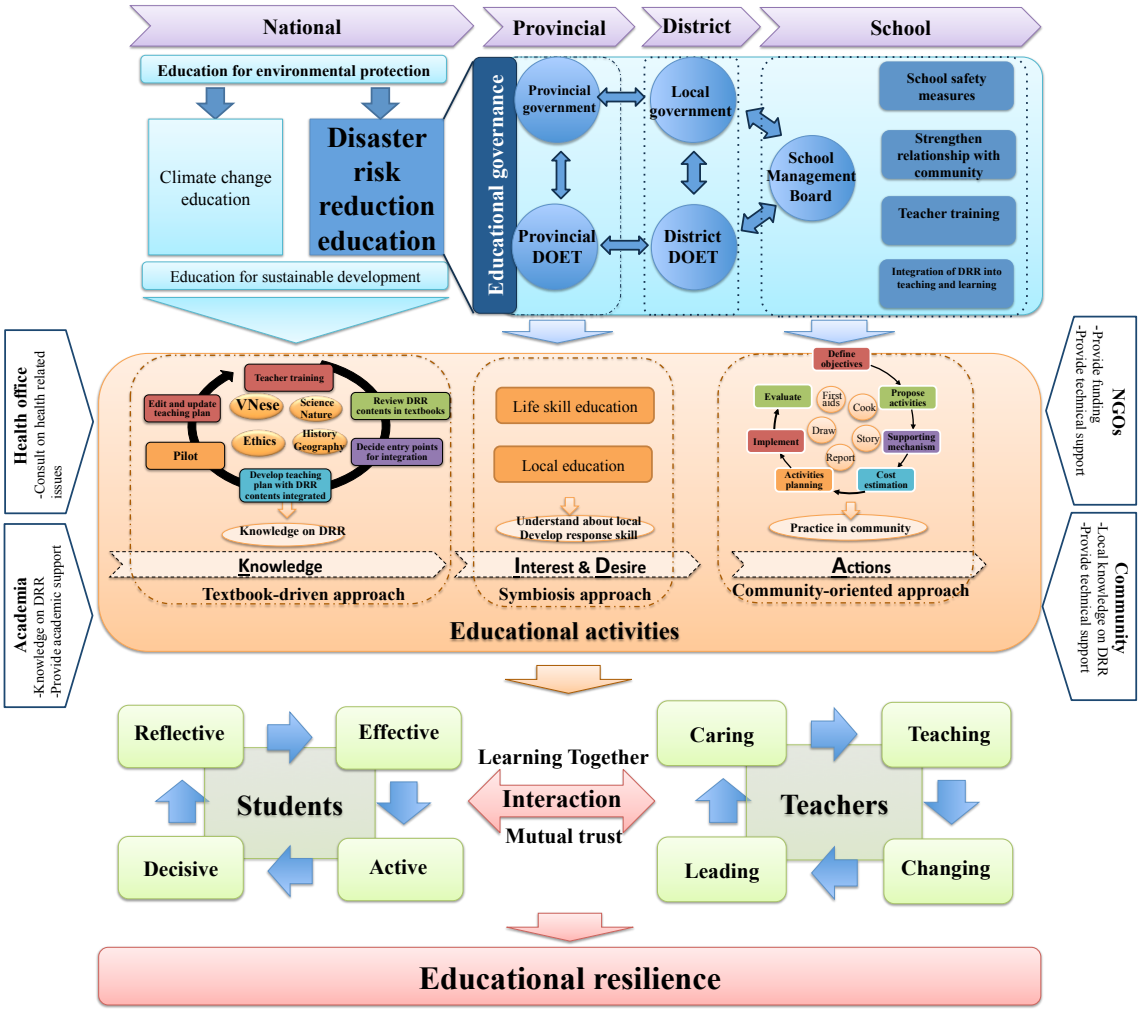

Figure 7.1 Framework to promote school-based DRRE

Firstly, the reduction of structural damages between the period of ten years from 1990-1999 and from 2000-2009 thanks to the "School Concrete Projects" was a strong evidence for the effectiveness of carrying out school safety measures and improving physical conditions. In addition, results from school resilience assessment show a strong relationship between schools that have higher score in physical resilience also achieves high score of overall resilience. School-based approach focus

on school safety measures, especially on effort of school for regular checking school building and appropriate arrangement of equipment. In particular for school equipment and facilities, findings from research show that the damages on equipment and facilities often bear the main part of total damages. The importance of risk assessment and risk identification in raising awareness and enhancing knowledge base on the local context has been highlighted in the Priority 2 of HFA (UNISDR 2007a). Carrying out regular check on facilities and equipment is very important for teachers and students to understand their school's situation and potential risk toward a disaster.

Secondly, findings from research found that improvement of human resources can help to enhance resilience capacity of school in a short-term period. Of which, teacher training is considered as entry point for implementation of DRRE, enriching students' knowledge and skills, as well as awareness raising for family and community.

Thirdly, while improvement of human resources is considered as short-term strategy, strengthening relationship between school and community should be employed as long-term and sustainable strategy in building resilience. Findings from the result of two years assessment in Hue City has shown a reduction of external relationship, especially between school and community. This issue is addressed by school-based approach as it emphasizes on participation of school in both disaster management planning and DRR activities of local community and regular meeting between school with local government and local DoET.

Experiences from Japan about change of living styles in urban and rural and its effects on disaster education have important implications to the future disaster education in Vietnam. Economic growth and urbanization in Japan occurred from 1955 to 1975, with the expansion of urban areas and larger concentration of population (Takeuchi *et al.* 2011). Japanese life style was changed quickly after 1975. Before 1970s, it was common for a household consisting of a mix of several generations. However, under collisions of modernization, people tend to move out and live alone or young couples start their own families. Consequently, disaster education learning process established in a long time between family members and local people has been disconnected and replaced by a different form, whereby mutual help and public help reduce while self help increases. Different types of disaster education based on specific local characteristics and social dynamics were suggested. For examples, for community which have strong social capital, the combination of self help, mutual help and public help makes the best out of different approaches; for

the one which have less community connection but strong family interaction, self help and mutual help among family members should be promoted (Takeuchi *et al.* 2011). Other study on innovative approach for disaster education, Shiwaku and Fernandez (2011) emphasized the role of disaster education in strengthening the networking within community and building local capacity to response to disaster. The study introduces an example of disaster education in Saijo City, named "Age 12 Education", which includes town watching and mountain watching as part of the program. These two activities create a platform where different stakeholders including students, teachers, parents, community, local government officials, and other members were able to share their experiences on disasters, knowledge on local background, and understanding on role of each other in disaster risk reduction (Shiwaku and Fernandez 2011).

Finally, school-based approach has the potential to facilitate the harmonization of DRRE with different types of education such as EE, CCE and ESD. Although this linkage is included in the educational policy at national level, its implementation at local and school level is still lacked of. Involvement of MoNRE in the implementation of DRRE, especially in the projects of integrating DRR into teaching and learning activities, will create a platform for synchronization of different types of disaster, especially between CCE and DRRE. There is a certain link between these types of education depends on the nature of impacts by environmental disturbance, climate change as well as natural disasters to the countries or regions. For example, Læssøe (2013), in an effort to connect different types of education under the umbrella concept of education for sustainable development, has found from analysis of cross-national policy that disaster risk reduction is considered as a key driver of climate change education in countries strongly challenged by climate change. In these countries, DRRE is integrated into broader climate change education and education for sustainable development policies; while in other cases, green economy and TVET for green skills are considered as driver for climate change education. The Philippines is seen as an illuminating example on this issue, which embed DRRE and climate change education in one scheme by issuing a standing order entitled "Reiteration of Related Implementing Guidelines on Climate Change Adaptation and Disaster Risk Reduction at the School Levels" (Glenn and Shaw, 2013). This directs schools to revitalize the various programs and projects on disaster risk reduction and CCA and to combine climate change education and DRRE with environmental education into

elementary and high school curricula (Reyes, 2011). In some other countries such as China, Bangladesh, Denmark, among others, DRRE is approached as a matter of enhancing the knowledge on the science of climate change, fostering awareness of climate change and/or disseminating disaster risk reduction instructions (Reyes, 2013). According to Shaw et al (2011), education for sustainable development provides an umbrella concept to link different types of education, from development education to environment education and DRRE. There is one case study from Kenesuma of Japan has proved the positive impacts of education for sustainable development program on disaster recovery and strengthening the school community linkage (Oikawa 2014). The study assumes that provision of school lunch, schools bus, and scholarships for affected students as part of education for sustainable development program has contributed largely to restart the regular education process in the recovery process of the East Japan Earthquake and Tsunami disaster.

7.3.2 Effective educational activities on DRR

School-based approach not only focuses on improving governance aspect, but also on educational activities. It attempts not only to provide students with adequate knowledge on DRR through content available in textbooks, but also give students chance to work with local community and practice basic skills to response to disasters. The ultimate goals of DRR educational activities, therefore, not only to equip people with enough knowledge and actions, but also to provide understanding about local context and to make them have desire or interest in protecting their own community.

As it is stressed from many studies that school DRRE should be conducted as part of curricular and extra-curricular activities in order to increase the hours spent (Shiwaku and Fernandez 2011), to increase sustainability (Petal 2009), to ensure producing of appropriate actions to response to disaster (Bonifacio *et al.* 2010), and to link school to community (Shaw *et al.* 2004, Shiwaku 2011). Findings from this study show that, curriculum and extra-curricular activities only cannot help to fulfill the tasks of educational activities. Rather, the utilization of local education and life skill education through symbiosis approach is extremely important. It provides students with knowledge and skills on response to disasters, enhance students' understanding on local context, as well as nurture students' desire to protect their community against disasters.

Symbiosis approach is emphasized in this study as an innovative approach, which has advantages through win-win relationship between cross-curricular subjects and DRR contents. In this approach, a subject that is already in place acts as a carrier for DRR learning while at the same time is itself enriched. The principle of this approach relies upon the 'family resemblance' between cross-curricular and DRR contents. For example, both of them focus on the topic related to developing social awareness or empowering the individual for active citizenship. In this study, the symbiosis approach was applied in life skill education and local education. Life skill education at primary level in Vietnam targets basic skills such as coping and self-managing skills, cognitive skills (including self-awareness, decision-making, and problem-solving) and social skills (such as communication skills, cooperation skills, listening to others). These skills are found appropriate to facilitate proper actions of students during the time of disasters. Finding from research shows that contents related to DRR found the majority spaces through cognitive skills and social skills.

7.3.2.1 Integration of DRR into curriculum

Findings from the study shows that there are disaster risk reduction contents exist in the current text-book, as well as national curriculum, yet the contents is still not comprehensive. Besides, centrally control on textbook and curriculum hinders those contents on disaster risk reduction from being localized and adapted to local level. As Vietnam possess national textbook, the study proposes that textbook driven approach should be utilized as entry point for the integration of disaster risk reduction into curriculum. Findings from the study show that integration of disaster risk reduction into curriculum should be done through subjects of Vietnamese, Ethics, Science and Nature (for grade 1, 2, and 3) and Vietnamese, Geography and History (for grade 4 and 5). There are good practices on how textbook driven approach can be used in a flexible way to facilitate DRRE. For example, case study from Lao PDR shows an adjustable approach with the decision on integration of DRRE comes up from the Department of general education and secondary school (ADPC, 2007). It allows 20 percent adjustment in curriculum design for DRRE in school. This practice makes the curriculum highly localized and contributes in engaging the local partners to insert the needed adjustment to make the design more adaptive to local needs (ADPC, 2008). Another good example on locally controlled curriculum is of Indonesia, where curriculum samples are given to schools for their own integration. If there are schools

in high-risk areas, they have the flexibility to develop their own curriculum on disaster risk reduction based on their need and an analysis of local conditions. To ensure the quality of disaster education, the process of development curriculum undergoes evaluation or competency review by Ministry of National Education (Reyes *et al.* 2011)

7.3.2.2 Integration of DRR into cross-curricular subjects

The integration of disaster risk reduction into life skill education and local education is proposed using symbiosis approach, whereby life skill learning and local program are utilized as entry point for disaster risk reduction, at the same time enriches the subjects themselves. According to UNESCO (2012), symbiosis approach to disaster-related curriculum integration relies upon the 'family resemblance' between DRR and other cross-curricular initiatives concerned with developing social awareness and empowering the individual for active citizenship that are already mainstreamed. In this way, a cross-curricular dimension that is already in place acts as a carrier for disaster risk reduction learning while at the same time is itself enriched (UNESCO, 2012). Findings from research found that life skill and local education are two subjects that have potential to be carriers for DRR contents. Life skill is "the ability for positive and adaptive behavior that enables a person to deal effectively with the demands and challenges of every day life" (WHO), therefore, integration of disaster risk reduction through life skill learning is important, especially for the development of self-help skill, for the establishment of personal responsibility for actions and choices, as well as development of decision-making skills. Furthermore, the integration of disaster risk reduction into local education program will provide students with knowledge on their own living environment and help them understand about local context. All of these will engage students in future-oriented thinking and offer opportunities for students to make decisions independently.

7.3.2.3 Integration of DRR into extra-curricular activities

The integration of disaster risk reduction into extra-curricular activities is utilized community-oriented approach, which provides students opportunities to work with local community and thus strengthening the connection between school and community. Findings from the research found ten variety of activities including Drawing competition, Hazard mapping, Town watching, First aid and task, Evacuation drill, Newspaper reading and making, Story show, Essay contest, and

Emergency bag. Aside from these activities, there is a good case study of disaster education in the Philippines where science club in school is employed as an effective vehicle that provides positive and supportive environments for the distribution of disaster risk reduction contents and enhancement of youth participation in disaster risk reduction (Shiwaku and Fernandez 2011). The activities of science club related to disaster risk reduction or CCA are implemented regularly, especially on the two occasions of the National Disaster Consciousness Month in July and the National Science Club Month in September. Examples of disaster risk reduction activities can be sharing lessons on disaster risk reduction during flag-raising ceremony; engage in the discussion of disaster prevention, mitigation, and preparedness in class; advocate disaster risk reduction as a way of life; hold a symposium on disaster risk reduction; and conduct essay writing and slogan contests on disaster preparedness (Cabasal 2010). Fernandez (2012) emphasized that the contribution of science club members and advisers in disaster risk reduction activities is significant because they have local wisdom such as the settings of their school and community, or information about locally accessible resources for a potentially sustainable community-based disaster risk reduction.

7.3.3 Synergy between governance and education

Building resilience using school-based DRRE is considered as a good strategy to empower capacity of education sector by focusing on educational activities and governance. Determined by internal (individual) factors and external (environmental) factors, educational resilience is established on the interaction between students and teachers. Together with the process of learning together, mutual trust between teachers and students is set up as the basis for building educational resilience. The importance of trust in the context of education is highlighted in resilience research because trust influences the behaviors of teachers, which in turn influence the behaviors and actions of students. In this way, students can learn to be resilient and teachers play imperative role in promoting resilience. It is found from the resilience research that individual factors such as reflective, effective, active and decisive characters are internal factors that contribute significantly to student resilience. Besides, skills that address resilience attributes such as the ability to incorporate multiple forms of knowledge in active learning and perspectives in management decision making, would be important in fostering resilience. Teachers can facilitate

the cultivating environment in various ways to enhance students' resilience. Aside from teaching, caring to students and nurturing mutual trust through process of learning together with students are crucial to foster resilience. A common finding in resilience research is the power of a teacher to change and take leading role not only in educational activities but also to attend in the policy-making process and impacts to the institutionalization of DRRE. The leading role of teachers in both governance and educational activities will help to harmony these two components in an effective manner to advance DRRE.

The framework of school-based DRRE will be crucial input for the establishment of a process to promote DRRE draw upon the context of primary education in Hue Province and Da Nang City, Central Vietnam. Details of the process to build resilience will be described in the next part of the study.

7.4 Building resilience for the primary education system in Central Vietnam

This part explains the process to utilize the school-based framework in planning for DRRE, base on which to improve educational governance and educational activities and to build resilience for the primary education system in Central Vietnam.

7.4.1 Planning for DRRE

7.4.1.1 Assessment of school resilience to disasters

The SDRA tool applied to assess the current level of school resilience in this study is a comprehensive, well-structured and simple used methodology, which comprises 75 variables categorized in 15 parameters and 5 dimensions. The selections of variables are based on the (i) climate disaster resilience index (CDRI) which is a set of indicator originally developed to assess the resilience level of a city, (ii) the Hyogo Framework for Action (HFA) which defined the actions needed to bring about meaningful disaster risk reduction, and (ii) the specific context of socio-economic and educational system in the Central Vietnam. Therefore, the SDRA is an inclusive method that takes into account not only the aspects of reducing risks, but also the capacity of school to response and bounce back to the original state, or the level of school resilience to disaster.

The advantages of the SDRA are considered as follow:

- Proving understanding on the current level of school resilience to disasters, as well as the strengths and weaknesses of school capacity in promoting DRRE.

Application of SDRA for primary schools in Hue Province and Da Nang City found different challenges for the promotion of DRRE in various regions including limited human capacity, budget constraints, and schools location in the hazardous areas, among others;

- Raising awareness of school principals and staff on the disaster risk reduction related issues as well as the different aspects of educational resilience; and

- Helping School Management Board to develop a better plan on DRRE. Based on the results from SDRA, schools can define the specific actions on educational governance and educational activities, which can lead to teachers and students' resilience and contribute to educational resilience as a whole.

Aside from the positive effects in contributing to the implementation of DRRE, improvement of the SDRA is also needed. As the SDRA is an indicator-based approach, it faced challenges such as over-reliance on qualitative indicators, less clearly measurable indicators (Liebman and Pavanello 2007, Cutter *et al.* 2010). To overcome this issue, explanatory note of the qualified questions was prepared to reduce the gap of understanding among responders. Besides, it was found from the interviews with the principals that the SDRA questionnaire includes too many questions or variables, thus it took time to complete the whole questionnaire. To solve this problem, the author proposes to merge some variables in order to reduce their number, for examples, *regular check on facilities and equipment* can be merged with *regular check on hazardous materials*; or in some cases, the unnecessary variables can be deleted, for example, *the location of school in community*, as all investigated schools located inside the community. In the limit of the research, there are different factors that need to be incorporated for further improvement such as background of students, gender issue, in particular the role education of girls in sustaining the educational resilience.

7.4.1.2 Create plan for DRRE

The process to create plan for DRRE includes four steps:

- Step 1: Creating the actions

The actions were formulated through focus group discussion with the participation of provincial, district, local DoET, school principals and teachers. This step was done base on the framework of SDRA where measures to build resilience are available.

- Step 2: Defining stakeholders' roles and timing schedule

In this step, the stakeholder workshop is organized involved variety of participants. Stakeholders are defined as the individual or organization whose decisions or actions have influences on the implementation of DRRE in practice. There are 11 defined key stakeholders including staff from provincial DoET, district DoET, school teachers, staff, students, parents, local community, local government, health center, academia, NGOs and others such as the Study Encouragement Society, Woman Union, etc. Among these, the role of teachers is highlighted as the key implementer for the majority of actions. The most important supporting role belongs to district DoET staff and local government.

During the stakeholder workshop, after the role of each stakeholder is defined, each group of stakeholders is requested to identify the proper time schedule for the implementation of each action. Accordingly, the actions are defined in the time scale of short-term (less than two years), medium term (from two to five years) and long-term (more than five years).

- Step 3: Prioritizing the actions

This step is important as it helps the policy makers as well as practitioners focus on the most effective actions in term of spending less resources yet bringing high efficiency and also facilitating the most potential to address the actual needs. In order to find out which actions that satisfy these conditions, the study used the two criteria: (i) actual needs of schools, which is defined by the level of importance of variables rated by the school principals; and (ii) the level of variable itself contributes to the overall resilience, which is defined by the correlation between variables and the overall resilience.

7.4.1.3 Integrating DRR into teaching and learning activities

As one of the key findings revealed that educational activities are important for DRRE since it facilitates the interaction between students and teachers, and between schools and community. It was found in this study that integration of disaster risk reduction into curriculum, cross-curricular subjects and extra-curricular activities has the potential not only to equip school teacher and students with proper knowledge, but also to improve the knowledge on local context, to encourage students' actions on responding to disasters. In this way, the process connects students with the local community, involves community participation in school disaster risk reduction

activities, and strengthens the relationship between school and community, contributing toward building community resilience to disasters.

From the key findings, the study proposed a model to comprehensively integrate disaster risk reduction into teaching and learning activities in schools.

- *Integration into curriculum*: Textbook-driven approach will be applied at the school level and the selected subjects as carriers for disaster risk reduction contents are Vietnamese, Nature and Society (for grade 1,2,3) and Vietnamese, Ethics, Science and Geography (for grade 4,5).

- *Integration into cross-curriculum*: Symbiosis approach will be applied to integrate disaster risk reduction contents into the two selected subjects are life skill and local education.

- *Integration into extra-curricular activities*: The integration of extra-curricular activities will be done to supplement the practical aspects of the integrated knowledge on disaster risk reduction that students learn in class.

As curriculum in Vietnam is centrally controlled and the cross-curricular subjects such as local education and life skill education is provincial controlled, the extra-curricular activity is the most important and flexible part that can help to promote DRRE at school level. As the extra-curricular activities is designed by school teachers base on the available resources of schools, the interests and needs of students, and the specific context of environment surrounding schools. Integration of DRRE though extra-curricular activities can help to overcome the two major challenges found in the research: (i) improve the external relationship between school, community and other relevant stakeholders, and (ii) encourage students to work closely with community and to formulate appropriate actions to response to disasters when necessary. Other study on the disaster education also suggested that extra-curricular can be used for active school disaster education and for utilization of additional material developed (Cabasal 2010).

7.4.2 Implementation of the DRRE action plan

The action plan on DRRE will be an important input for the development of annual socio economic development plan (SEDP) of the province and the city. It is crucial for the policy-makers to incorporate the DRRE action plan into the SEDP to ensure that the implementation of DRRE will be sustained and provided with proper supporting mechanism including both technical and financial support. Annually, the

provincial government will collect developmental demands from district and local level, combined with new directions and guidelines from national level to establish their own SEDP. Therefore, the mainstreaming of DRRE action plan should be done in the same way, provincial DoET will be key responsible for synthesize, combine and balance the demands on DRRE together with different educational demands in order to provide inputs for the provincial SEDP. The provincial government then will consider, review, and give approval base on the available resources of the province (Figure 7.2). In this way, integration of DRRE action plan will provide strategy for the implementation of the provincial disaster risk reduction action plan as a whole.

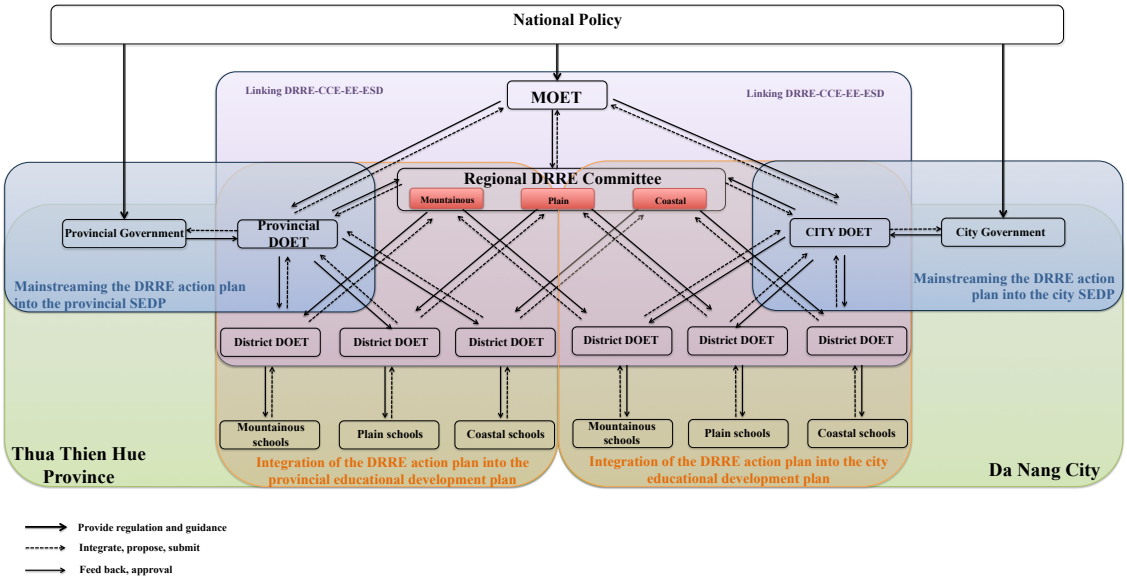

Figure 7.2 Mainstreaming the DRRE action plan into the SEDP and educational development plan, linking the DRRE with different types of education

Simultaneously, it is also essential for the DRRE components to be integrated into the educational development plan base on the inputs from school level. District DoET often plays important role in supporting schools to integrate a new component, such as DRRE, into school planning. However, the national controlled curriculum and provincial controlled LE and LSE hindered the schools to adapt DRRE within the local geographical as well as socio-cultural context, which is crucial for successful implementation of DRRE. Therefore, this study proposed for an establishment of a regional DRRE committee. Although the regional committee is popular in some countries such as Japan, it has not yet existed in Vietnam before.

The regional DRRE committee should consist of staff from provincial DoET, personnel responsible for disaster risk reduction such as staff of the Provincial Committee of Storm and Flood Control, policy makers from provincial government, and academia such as staff from University, among others. Such a group is necessary, as the provincial DoET alone cannot provide adequate support for schools in different regions. The committee has the potentials to play a vital role in integrating DRRE into the SEDP and the educational development plan. Besides, the Committee is important as it provides a regional flat-form for school located in the same topography, damaged from the same types of disasters to share experiences as well as safety measures in response to disasters. In addition to their role in supporting planning for disaster risk reduction, the committee is expected to contribute largely to the integration of disaster risk reduction into teaching and learning activities as well. A shifting from centrally controlled curriculum to regional level is therefore needed in order to make the educational programs more flexible base on the specific conditions in the local areas, as well as the capacity of schools, the ability of teachers, and the interest of students. If such a group can be formed and take DRRE into effects, the practices of DRRE among schools in different regions and within the same regions alike will reduce considerably.

Another challenges for the implementation of DRRE found in this study is the lack of interactions between DRRE and other types of education such as climate change education, environmental education, and education for sustainable development. Despite the fact that linkage between these forms is clearly mentioned in the national policies, the practical connection between them is blacked out. As mentioned in the DRRE policy that DRRE will be developed base on the environmental education, parallel with climate change education and contribute toward the achievement of education for sustainable development. In order to bring these issues into the provincial plan and to the schools' educational program, the top-down approach whereby the Regional DRRE Committee can be a median is essentially effective.

Furthermore, the establishment of the regional DRRE committee will provide favor conditions for the replication of DRRE practices among schools within the same regions or between different regions.

7.4.3 Monitoring and evaluating the implementation of DRRE

In order to have a better plan for DRRE and an advanced implementation of DRRE in the future, monitoring and evaluating the implementation of DRRE are needed. Teachers were found as key responsible for reporting and revising the plan. The report should focus on the achievements and the failures when implementing DRRE in practice. Achievements on DRRE can be evaluated using the framework of SDRA, and checking the progress against the time schedule that was defined in the action plan through multi-stakeholders workshop. For each of the actions, the SMB has the responsibility to inspect, supervise, and monitor the level of implementation, which will be carried out by the teachers. Besides, the contribution of each stakeholder in the implementation of DRRE has to be taken into account to ensure the participation of various targets in an effective way.

7.4.4 Replication of the DRRE in other regions

Although education is very much rooted in the local context, there are still basic principles of education, which are universal and can be applied to different regions. Accordingly, the set of resilience indicators, the process of school-based planning for DRRE, as well as the process of integration of DRRE into teaching and learning activities in this study although developed along with the specific conditions of Central Vietnam can be repeated by modifying and making it compatible with other regions, particularly for the cities or provinces located along coastal line.

Vietnam possesses a national education system, whereby national control makes the education uniform and homogenous among different geographical or diverse socio-economic areas. Therefore, it needs only minor customization to reproduce the SDRA tool, which was developed incorporating most of the typical features and general characteristics of the education system in Vietnam. Among five dimensions, the external relationship requires the most modifications when applying SDRA methodology throughout different areas. For examples, questions related to fund mobilization from resources outside school, support from community to school, collaboration between school and local government, or location of school in local community. These factors vary largely depending on the cultural and socio-economic conditions such as local people's professionals and incomes, developed or less developed, urban or rural, majorities or minorities, etc. Correspondingly, the stakeholders who will be involved in developing the action plan for DRRE will need

to be reconsidered and redefined base on the actual relationship of school with local social organizations.

According to Shaw *et al.* (2011), key issues for risk reduction interventions are sustainability and up-scaling, whereby international organizations, regional taskforce, or national agencies can play a crucial role in reproducing the DRRE program and spearheading the DRRE initiatives throughout different countries and regions. There are two favor aspects that help to bring this study to a larger application throughout the ASEAN countries as well as the developing countries in Asia. Firstly, the education system in these countries shares some analogous characteristics, where education is a national product and all decisions are made at the national level (Cheng 2005). Secondly, according to a regional analysis on DRRE in the Asia Pacific, significant progress has being done in promoting disaster risk reduction and DRRE among the countries in the regions (UNISDR 2009). In particular, the formulation of ASEAN Charter in 2007 together with its strong commitments on climate change adaptation and disaster risk reduction will bring a turning point for the promotion of DRRE among ASEAN countries. Kuala Lumpur Declaration on the Establishment of the ASEAN Charter (2005) has defined that mainstreaming disaster risk reduction into education including integration of disaster risk reduction in school curriculum, disaster safety of educational facilities, and promotion of public education, awareness and advocacy on disaster risk reduction has been set as priorities among its members. Each project will be led by different country members. Vietnam was assigned to lead the project on disaster safety of educational facilities, which aims to strengthen school buildings and facilities before a disaster. Besides, commitments from high-level national policy makers has been reiterated in subsequent regional gatherings, including the Second and Third Asian Ministerial Conferences on Disaster Risk Reduction in 2007 and 2008. The establishment of the Asia–Pacific Regional Task Force on Education and School Safety in 2007 has created great opportunities for promoting DRRE throughout the countries in the region (UNISDR 2009). In addition, with the integration of the Regional Network for Education and School Safety in the Asia–Pacific as part of Global Education Listserv, it can be expected that more experiences, opinions, and materials on DRRE will continue to be shared and exchanged both within the region and beyond its boundaries (UNISDR 2009).

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Chapter 8 Conclusions

The study is an effort in contributing to the promotion of disaster risk reduction education at primary level in the education system in Central Vietnam. From the assessment of school resilience using the School Disaster Resilience Assessment and teacher's assessment, it comes to conclusion that by focusing on school-based approach or putting school at the leading point of disaster risk reduction education with involvement of various stakeholders, educational resilience can be built in a sustained manner.

Contents

CONCLUSION

Climate related disasters in Vietnam cause tremendous damages on different sectors, including education sector, as described in Chapter 3 (session 3.1). Students and teachers are particular vulnerable to disasters when the impacts are directly to human lives or indirectly to school infrastructure, which interrupt educational continuity and reduce educational quality. This study quests for the answers on how school's capacity in preparedness and response can be accessed, how to develop plan for effective disaster risk reduction education, how to integrate and sustain disaster risk reduction knowledge into teaching and learning activities, as well as the options for building educational resilience. In order to do that, the study first examines the key factors of educational resilience to form a basis for the development of School Disaster Resilience Assessment tool. Secondly, it tries to formulate the process to develop for disaster risk reduction education using school-based approach. Finally, the study proposes an innovative model integrate disaster risk reduction into curriculum, cross-curricular subjects, and extra-curricular activities in school.

First, the concept of educational resilience is reviewed and applied in the context of DRR to provide an understanding on disaster educational resilience. The study then seeks for the key factors to build resilience of the education sector. Base on the concept and key factors of educational resilience, the author developed the School Disaster Resilience Assessment tool by looking through the existing Climate Disaster Resilience Index and the sixteen tasks of Hyogo Framework for Action designed for education. The School Disaster Resilience Assessment was then applied to assess the resilience level of primary schools in Hue Province and Da Nang City.

Second, the actions to enhance educational resilient capacity were formulated and used as a framework to develop action plan for the education sector to carry out disaster risk reduction education. The action plan with defined roles of key stakeholders and time schedule for each of actions was established in a participatory manner through workshops and focus groups discussion.

Third, a comprehensive model on the integration of disaster risk reduction into school curriculum, cross-curricular subjects and curricular activities through different approached are studied to ensure the proper translation from knowledge into actions. In this process, the role of teachers is considered as key agent to build students' resilience to disaster by encouraging students' interest in local issues, facilitating students' desire in protect their own community and helping students response to disasters in an active manner. In order to enhance awareness and build capacity for teacher, different types of teacher training including in-service and pre-service training were discussed.

In summary, the study is an attempt to develop the strategies to implement disaster risk reduction education using school-based approach. This approach emphasizes the leading role of school teachers and involvement of different roles of various stakeholders from provincial, district to local level. The ultimate purpose of the study is to maximize effectiveness of educational governance and educational activities in a way that help to strengthen educational resilience to natural disasters.

8.1 Key factors of school-based disaster risk reduction education

Finding from research provides a comprehensive understanding on disaster risk reduction education practices in the specific context of Central Vietnam, from assessment to planning and integration of disaster risk reduction into teaching and learning activities. By focusing on school-based approach, or putting school at the leading point of disaster risk reduction education, this study has come up with the following important saliences and recommendations for building educational resilience of the education system.

8.1.1 Educational resilience and key factors

The study of educational resilience has expanded from an early focus on educational activities such as schooling and curriculum, to a broader inclusive focus on educational governance such as external supporting system and involvement of different stakeholders. The important factors for assessing educational resilience takes into account strengths and capacity of school in terms of resources (human resources, physical structural), institutional issues (such as planning for disaster preparedness recovery and response, management on different activities relater to disaster risk reduction in school), and network or external supporting system (such as collaboration with local government,

relationship with local community, financial as well as general support from different stakeholders).

8.1.2 School disaster resilience assessment [SDRA]

The concept of educational resilience and key factors are utilized in the development of SDRA tool. The SDRA tool applied in this study comprises a comprehensive set of indicators on examining the level of school resilience. It not only provides a tool for assessment but also is considered as an effective tool for disaster risk reduction planning at both school and provincial level. In particular, it provides School Management Board an understanding of the specific education activities and governance activities to focus on which can lead to students and teachers' resilience whereby school resilience is improved. The SDRA helps provincial policy-makers in building resilience for the primary education system in different regions as it illustrates the variation of resilience between regions. Lastly, this tool is useful in determining the priorities in planning for disaster risk reduction as it identifies which parts of the school are most vulnerable to disaster, the level of damages, and which resources are important to help school bounce back quickly to its origin state, or resilient to disasters.

Result from the SDRA assessment in Hue and Da Nang shows that high scores in Physical conditions and Human resources are observed in both the two regions. Among the four categorized urban and rural in Hue and Da Nang, schools in rural Da Nang achieved the highest score of overall resilience despite the lowest score in Natural conditions. Thus, educational resilience can be built through the improvement of DRRE. Especially teacher training is found as one of the most important strategy in upgrading Human resource, which is considered as short-term policy to enhance resilience level.

Findings from the assessment of schools based on measurement of Physical conditions, Human resources, Institutional issues and External relationships have specific implications to the practice of school-based DRRE. For example, assessment of Physical conditions proves that resilience of school building can be ensured through adherence building codes, regular check on school building and facilities, arrange school equipment to reduce damages, change school location in hazardous areas. Also, understanding food safety, organizing environmental campaign, and maintaining good hygienic conditions were found in this study as other ways to ensure the structural and physical safety of

schools. According to UNESCO and German Federal Ministry of Education and Research (2009), a safe education facility is that which is either located in a danger-free zone or has been built to be resilient to an extreme natural event. The majority of primary schools in Central Vietnam illustrate a need of structural improvements and proper land use planning. In case of Da Nang City, urban schools show lower resilient level of Physical condition dimension compare to rural schools due to pressures from urbanization and increasing number of students. In particular, school buildings located next to the coastal areas need to be either relocated or reinforced so that it can be resistant with disasters, especially typhoons and floods. In case of Hue Province, it is important for school buildings, especially for schools located in rural mountainous and coastal areas, need to be concreted to provide better shelter for community after a disaster. Besides, regular structural check and reinforcement should be incorporated into school planning for sustained disaster risk reduction. To promote better culture of safety in school, the structural issues such as building codes, land use planning, environmental protection, hygienic measures needed to be included in educational materials to provide enough knowledge for students and to encourage student's contribution in ensuring school safety.

8.1.3 Educational Disaster Resilience Action [EDRA]

The educational disaster resilience actions are developed base on the framework of SDRA, which helps to incorporate risk awareness and risk reduction strategies into school planning. This process also contributes to institutionalize the disaster risk reduction education, which put disaster risk reduction education as one priority for school development. Making educational disaster resilience action plan takes three main steps: stakeholder analysis, timing schedule and prioritizing actions.

Results from stakeholder workshop emphasize the leading role of teachers in the majority of actions. Teachers should be in the best position to offer recommendations to policy-makers and educational authorities on how to further improve the disaster risk reduction education practices. A plan of disaster risk reduction education that is proposed from school level will help policy-makers in the provincial and higher level to set an appropriate disaster risk reduction education guideline which incorporates local context and actual needs of school teachers and students.

Aside from the leading role of school teachers, local government and local DoET has the most essential supporting role, especially for educational governance and strengthen physical conditions in school. Especially, the supporting role of local government in the planning and implementation of school disaster risk reduction education will helps to strengthen school capacity in response and recovery to disaster. In Vietnam, local government not only gives support to school during the time of disaster, but even plays a more important role during the recovery process, particularly when school experiences severely structural damages.

On the other hand, different roles of other stakeholders need to be enhanced to contribute effectively to DRRE. For example, the role of students has not recognized in the context of primary education in Central Vietnam. While the role of students in promoting school disaster risk reduction education as well as public disaster risk reduction education has been stressed from academic researches (Krovetz 1999, Davis 2007, Cefai 2008, Fernandez *et al.* 2011) to international efforts (Islamabad Declaration on School Safety 2008, OECD 2008, 2009, UNISDR 2011). It is therefore attentions should be paid on encouragement of students' active role in all stages of disaster risk reduction education. Besides, study found that parents' involvement in facilitating disaster risk reduction education is crucial as making children understand the importance of building communities that are disaster resilient begins at home. Community is also expected to engage in active participation in the various efforts of school to provide students about the understanding on disaster risks in local area and the appropriate responses to help reduce the impact of disasters.

As a result, planning for disaster risk reduction education should be implemented by school teachers through participatory approach and base on the guideline or legal framework provided by authorities from national and local level.

8.1.4 Educational activities

While numerous of researches has encouraged the integration of disaster risk reduction into curriculum and extra-curriculum (Shiwaku 2007, UNISDR 2007, APEC 2009, Bonifacio *et al.* 2010), findings from this study added the value of integrating disaster risk reduction into cross-curricular subjects using symbiosis approach. In Vietnam, under pressures of national control, integration of disaster risk reduction into

general curriculum will leave little space for the modification of disaster risk reduction contents in the specific conditions at local level. Meanwhile, cross-curricular subjects such as local education (LE) and life skill education (LSE) are adapted to provincial level taking into account teachers' capacity and students' background. The integration of DRR into LE and LSE using symbiosis approach not only take into account the local context traditional wisdom, and cultural issues, but also equips students with appropriate skills to better response to local issues. It is found from the teachers' perception assessment that extra-curricular, which is determined by school principals and developed by school teachers based on available resources and students' interests, is the most effective and relevant for the implementation of disaster risk reduction education inside as well as outside classroom.

8.2 Future research on disaster risk reduction education

Findings and limitations of the research have given a lot of spaces for further exploration about disaster risk reduction education, either supplement or fulfill the research results or elaborate more about different aspects of this study. Results from policy analysis show that DRRE policy was driven in a top-down way by the state organs, with support and resources coming from international agencies. A strong institutional and legal basis at national level has been established for disaster risk reduction education. However, the process to pass down the policy from national to local level remains incomplete. Without this process, the actual implementation at local level cannot be done. Therefore, study on the mechanism to bridge the policy gap from national to local level is needed. Scaling up school-based advocacy and developing linkages between local and national level can be considered as one potential way. Besides, enhancing role of teachers and their participations in policy-making process through training and awareness raising is extremely important for the implementation of DREE.

Another focus for future research is to investigate the impacts of local economic development to the level of educational resilience. In one way, economic growth is one of the important factors for the improvement of resilience as it brings financial supports and other favorable conditions for the implementation of DRRE. In other hand, economic

development will cost people's time and efforts, thus limit their involvement in public activities. Study on the advantages and disadvantages of economic growth on educational resilience will therefore of extreme importance. It contributes not only to enhance resilience level but also to reduce negative economic impacts.

Besides, it is important to incorporate developmental issues such as gender, health, food security, etc. in order to bring together disaster risk reduction education with different types of educations such as CCE, EFA, and ESD. The issues on how to define and monitor the effectiveness and efficiency of the implementation of disaster risk reduction education and building resilience for the education sector are also needed. Attention can also be paid on the application of school-based disaster risk reduction education at regional level, whereby establishment of regional focal point for schools located in different geographical and socio-economic conditions is of importance. Finally, future research on the replication of school-based disaster risk reduction education to other Asia countries is strongly recommended.

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Appendices

Contents:

Appendix 1– School Disaster Resilience Assessment Questionnaire

Questionnaire Survey on Disaster Risk Reduction Education in Thua Thien Hue Province, Vietnam

Graduate School of Global Environmental Studies (GSGES), Kyoto University, Japan

Department of Training and Education of Thua Thien Hue Province, Vietnam

Hue University, Vietnam

This questionnaire aims to quantify vulnerability and resilient capacity of all primary and lower secondary schools in Thua Thien Hue Province, Vietnam. This study is focused specifically on climate-related natural hazards, such as cyclones, flooding, sea-level rise, Heat waves, water scarcity, etc. Thus, earthquakes, volcanic eruptions, and other geological hazards are not considered as part of this study. All the information obtained from this questionnaire will be strictly used for academic research purpose and kept confidential. Findings from this study are expected to contribute in promoting disaster risk reduction education in Vietnam.

Thank you very much for your kind cooperation.

Contact details of Respondent

Full name: _____

Affiliation: _____

Contact address: _____

Phone/fax: _____

Email: _____

Date when questionnaire was filled out: _____

NOTE: The questionnaire should be completed by the principal or a teacher who is familiar with the disaster risk reduction education. Answers should not be personal but representing the whole school.

General information of School

Name of School: _____

Name of Principal: _____

Contact address: _____

Phone/Fax: _____

E-mail: _____

Introduction of the school

Year of construction: _____

Location of the school: □ coastal area □ mountainous area □ low-land area

Is your school private or public? □private □public □half-private

School hour: □1 session/day □2 sessions/day □ other

Number of teachers: _____

Number of staff: _____

Number of students:

Primary	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
	students	students	students	students	students
Lower secondary	Grade 6	Grade 7	Grade 8	Grade 9	
	students	students	students	students	students

% of students continues to lower secondary school: _____

Number of students drop out of school year 2009-2010: _____

Number school building storey: _____

Number of classrooms: _____

School building design:

How to fill out the questionnaire?

This questionnaire consists of five dimensions with each dimension covering a few variables proposed to measure the resilience of the schools against climate-related natural hazards. There are a total of five dimensions, namely: Physical condition, Human resource, Institutional issue, external relationships and natural and include a number of parameters, please see the list shown below.

List of Dimensions and Parameters

Physical condition	Human resource	Institutional issue	External relationships	Natural conditions
School buildings	Teachers and staff	Planning	Collaboration	Severity of natural hazards
Facilities and equipment	Students	Management	Relationship of school to community	Frequency of natural hazards
Hygienic and environmental conditions of school	Parents/Guardians	Budget	Mobilizing fund	Surrounding environment

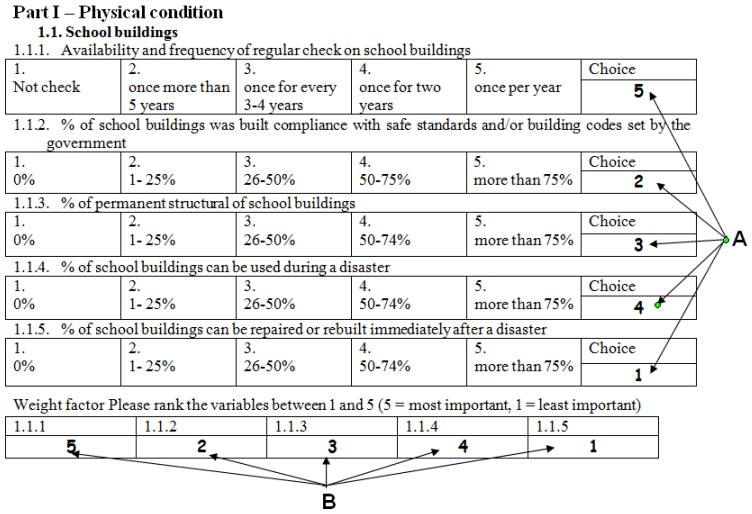
The questionnaire should be filled out step-wise, as you can see in the examples below.

First step:

A) Each dimension has 3 parameters, including 5 questions/variables. For each variable a choice should be made between 1 (poor, not available/existent) to 5 (very good).

B) After each variable is graded, each variable should be ranked against the other variables within a same parameter. Thus, the variables weighed according to their importance within the school's context between 1 (not important) and 3 (very important). This allows the person, or group who is filling out this questionnaire, to decide which variable should be considered or weighed More than the others within a parameter. This should be done in relation to the characteristics of the particular school.

Example, first step: dimension, physical; parameter, school buildings



Part I – Physical condition

1.1. School buildings

1.1.1. Availability and frequency of regular check on school buildings

1.	2.	3.	4.	5.	Choice
Not check	once more than 5 years	once for every 3-4 years	once for two years	once per year	5

1.1.2. % of school buildings was built compliance with safe standards and/or building codes set by the government

1.	2.	3.	4.	5.	Choice
0%	1- 25%	26-50%	50-75%	more than 75%	2

1.1.3. % of permanent structural of school buildings

1.	2.	3.	4.	5.	Choice
0%	1- 25%	26-50%	50-74%	more than 75%	3

1.1.4. % of school buildings can be used during a disaster

1.	2.	3.	4.	5.	Choice
0%	1- 25%	26-50%	50-74%	more than 75%	4

1.1.5. % of school buildings can be repaired or rebuilt immediately after a disaster

1.	2.	3.	4.	5.	Choice
0%	1- 25%	26-50%	50-74%	more than 75%	1

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

1.1.1	1.1.2	1.1.3	1.1.4	1.1.5
5	2	3	4	1

A

B

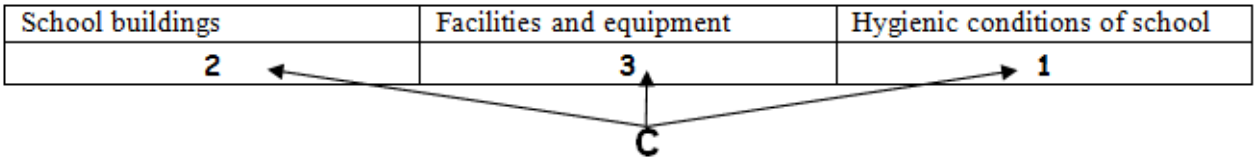
Second step:

Since there are 3 parameters for each dimension (see list above) the steps A and B should be done likewise for all parameters throughout the questionnaire.

C) Finally, each parameters, 3 per dimension, should also be weighed according to their importance related to the characteristics of the school, in the same way as mentioned in step B.

Example, second step: physical dimension

At the end of this part, please weigh each parameter by ranking them between 1 and 3 (3 = very important, 1 = not important)



1. Part I – Physical condition

1.1. School buildings

1.1.1. Availability and frequency of regular check on school buildings

1. Not checked	2. Once in more than 5 years	3. Once every 3-4 years	4. Once in two years	5. Once per year	Choice

1.1.2. Application of safety standards/building codes set by the government for school buildings

1. Not applied	2. Poor	3. Medium	4. Good	5. Very good	Choice

1.1.3. Availability of emergency exit door (not main gate)

1. Not available	2. Poor	3. Medium	4. Good	5. Very good	Choice

1.1.4. Availability of emergency shelter within school

1. Not available	2. Poor	3. Medium	4. Good	5. Very good	Choice

1.1.5. School buildings was affected by disasters in 2010

1. Very severe	2. Severe	3. Not so severe	4. Few affected	5. Not affected	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

1.1.1	1.1.2	1.1.3	1.1.4	1.1.5

1.2. Facilities and equipment

1.2.1. Availability and frequency of regular check on facilities and equipment

1. Not checked	2. Once per 2 years	3. Once per year	4. Twice per year	5. More than twice per year	Choice

1.2.2. % of facilities and equipment affected by disaster in 2010

1. More than 75%	2. 51-75%	3. 26-50%	4. 11-25%	5. Up to 10%	Choice

1.2.3. Availability of the emergency supplies (ex. emergency bag, storage food and water, flashlight,…)

1. Not available	2. Poor	3. Medium	4. Good	5. Very good	Choice

1.2.4. % of facilities/equipment repaired or renewed immediately after a disaster

1. 0%	2. 11-25%	3. 26-50%	4. 50-75%	5. More than 75%	Choice

1.2.5. Availability of environmental protection facilities/equipment within school (energy saving equipment, water saving facilities, etc.)

1. 0%	2. 11-25%	3. 26-50%	4. 50-75%	5. More than 75%	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

1.2.1	1.2.2	1.2.3	1.2.4	1.2.5

1.3. Hygienic and environmental conditions of school

1.3.1. Availability and frequency of environmental protection campaigns held in school

1. Not hold	2. Once per year	3. Twice per year	4. Four times per year	5. More than four times per year	Choice

1.3.2. Availability and frequency of regular check on hazardous materials to ensure safety against disasters

1. Not checked	2. Once per 2 years	3. Once per year	4. Twice per year	5. More than twice per year	Choice

1.3.3. Food safety conditions of school to ensure the health for students

1. Not notice	2. Poor	3. Medium	4. Good	5. Very good	Choice

1.3.4. % of garbage collected and dumped in proper place per day

1. Up to 10%	2. 11-25%	3. 26-50%	4. 51-75%	5. More than 75%	Choice

1.3.5. Availability of reuse/recycle system for school garbage (used papers, pens, etc.)

1. Not notice	2. Poor	3. Medium	4. Good	5. Very good	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

1.3.1	1.3.2	1.3.3	1.3.4	1.3.5

At the end of this part, please weigh each parameter by ranking them between 1 and 3 (3 = very important, 1 = not important)

School buildings	Facilities and equipment	Hygienic and environmental conditions of school

2. Part 2 – Human resource

2.1. Teachers and staff

2.1.1. % of teachers and staff affected by disaster in 2010

1. More than 75%	2. 51-75%	3. 26-50%	4. 11-25%	5. Up to 10%	Choice

2.1.2. % of teachers and staff equipped with proper knowledge and awareness about risk and impacts of disasters

1. Up to 10%	2. 11-25%	3. 26-50%	4. 51-75%	5. More than 75%	Choice

2.1.3. Frequency of regular disaster training/disaster training programs for teachers and staff

1. Not available	2. Once in more than 3 years	3. Once per 2-3 years	4. Once per year	5. More than Once per year	Choice

2.1.4. % of teachers and staff participated in regular disaster training/disaster training

1. 0%	2. 1-25%	3. 26-50%	4. 51-75%	5. More than 75%	Choice

2.1.5. Sharing of school emergency procedure and disaster preparedness plan to teachers and staff

1. Not share	2. Poor	3. Medium	4. Good	5. Very good	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

2.1.1	2.1.2	2.1.3	2.1.4	2.1.5

2.2. Students

2.2.1. % of students affected by disaster in 2010

1. More than 75%	2. 51-75%	3. 26-50%	4. 11-25%	5. Up to 10%	Choice

2.2.2. % of students equipped with the knowledge and awareness about risk and impacts of disaster

1. Up to 10%	2. 11-25%	3. 26-50%	4. 51-75%	5. More than 75%	Choice

2.2.3. Frequency of regular disaster training/disaster training for students

1. Never so far	2. Once in more than 3 years	3. Once per 2-3 years	4. Once per year	5. More than Once per year	Choice

2.2.4. % of students participated in regular disaster training/disaster training

1. 0%	2. 1-25%	3. 26-50%	4. 51-75%	5. More than 75%	Choice

2.2.5. Sharing of the school emergency procedure and disaster preparedness plan to students

1. Not share	2. Poor	3. Medium	4. Good	5. Very good	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

2.2.1	2.2.2	2.2.3	2.2.4	2.2.5

2.3. Parents/Guardians

2.3.1. Regular meetings of the Parent-Teacher Association (PTA) that specifically discuss on disaster related contents

1. Less than Once per year	2. Once per year	3. twice per year	4. twice per semester	5. More than twice per semester	Choice

2.3.2. Frequency of regular training for parents about risk and impacts of disasters

1. Never so far	2. Once in more than 3 years	3. Once per 2-3 years	4. Once per year	5. More than Once per year	Choice

2.3.3. Availability of school-home emergency notification system

1. Not notice	2. Poor	3. Medium	4. Good	5. Very good	Choice

2.3.4. Sharing of school's disaster preparedness and emergency management plan for parents to understand their roles in case of disaster

1. Not share	2. Poor	3. Medium	4. Good	5. Very good	Choice

2.3.5. Involvement and support of parents in school's disaster activities

1. Not involve	2. Poor	3. Medium	4. Good	5. Very good	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

2.3.1	2.3.2	2.3.3	2.3.4	2.3.5

At the end of this part, please weigh each parameter by ranking them between 1 and 3 (3 = very important, 1 = not important)

Teachers and staff	Students	Parents/Guardians

3. Part 3 – Institutional issue

3.1. Planning

3.1.1. Incorporation of disaster related content into school planning

1. Not incorporated	2. Poor	3. Medium	4. Good	5. Very good	Choice

3.1.2. Incorporation of disaster related content into school regulation

1. Not incorporated	2. Poor	3. Medium	4. Good	5. Very good	Choice

3.1.3. Incorporation of disaster related content into school syllabus

1. Not incorporated	2. Poor	3. Medium	4. Good	5. Very good	Choice

3.1.4. Availability of school's disaster preparedness and emergency management plan with defined role of staff, teachers, students and parents

1. Not available	2. Poor	3. Medium	4. Good	5. Very good	Choice

3.1.5. Availability of disaster recovery plan (shift classroom after disaster, alternate safe shelter, alternate evacuation route, etc.)

1. Not available	2. Poor	3. Medium	4. Good	5. Very good	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

3.1.1	3.1.2	3.1.3	3.1.4	3.1.5

3.2. Management

3.2.1. Availability of school early warning system (disaster calendar, public address, emergency contact list..)

1. Not available	2. Poor	3. Medium	4. Good	5. Very good	Choice

3.2.2. Dissemination of disaster related information (books, disaster newsletter, etc.)

1. Not available	2. Poor	3. Medium	4. Good	5. Very good	Choice

3.2.3. Implementation of disaster activities (town watching, disaster drill, writing/drawing competition, etc.)

1. Not available	2. 1-2 activities per semester	3. 3-4 activities per semester	4. 5-6 activities per semester	5. More than 7 activities per semester	Choice

3.2.4. Availability and frequency of regular meeting of disaster group with the participation of staff, teachers, students and parents

1. Not available	2. Less than Once per year	3. Once per year	4. twice per year	5. More than twice per year	Choice

3.2.5. Frequency of regular disaster training for disaster group

1. Never so far	2. Once in more than 3 years	3. Once per 2-3 years	4. Once per year	5. More than Once per year	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

3.2.1	3.2.2	3.2.3	3.2.4	3.2.5

3.3. Budget

3.3.1. % of school budget allocated for disaster related activities within school in 2010

1. (0%)	2. Less than 1%	3. 1.1-2%	4. 2.1-3%	5. More than 3.1%	Choice

3.3.2. % of school budget allocated for disaster outreach school activities to build partnerships (disaster activities held in community by school,…) in 2010

1. (0%)	2. Less than 1%	3. 1.1-2%	4. 2.1-3%	5. More than 3.1%	Choice

3.3.3. % of school budget allocated for replacement/repair after disaster in 2010

1. (0%)	2. Less than 1%	3. 1.1-2%	4. 2.1-3%	5. More than 3.1%	Choice

3.3.4. % of school budget allocated for monitoring facilities/equipment/infrastructure (regular inventory, school assessment,…) in 2010

1. (0%)	2. Less than 1%	3. 1.1-2%	4. 2.1-3%	5. More than 3.1%	Choice

3.3.5. % of school budget allocated for supporting students that have special needs in 2010

1. (0%)	2. Less than 1%	3. 1.1-2%	4. 2.1-3%	5. More than 3.1%	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

3.3.1	3.3.2	3.3.3	3.3.4	3.3.5

At the end of this part, please weigh each parameter by ranking them between 1 and 3 (3 = very important, 1 = not important)

Planning	Management	Budget

4. Part 4 – External relationship of school

4.1. Collaboration

4.1.1. Regular meetings of school with local Department of Training and Education that specifically discuss on disaster related contents

1. Less than Once per year	2. Once per year	3. twice per year	4. Four times per year	5. More than four times per year	Choice

4.1.2. Regular meetings of school with local People Committee that specifically discuss on disaster related contents

1. Less than Once per year	2. Once per year	3. twice per year	4. Four times per year	5. More than four times per year	Choice

4.1.3. Availability of communication system within the school campus and between other schools/institutions

1. Not available	2. Poor	3. Medium	4. Good	5. Very good	Choice

4.1.4. Availability of early warning system from local government

1. Not available	2. Poor	3. Medium	4. Good	5. Very good	Choice

4.1.5. Effectiveness of collaboration with local government during a disaster

1. Not effective	2. Poor	3. Medium	4. Good	5. Very good	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

4.1.1	4.1.2	4.1.3	4.1.4	4.1.5

4.2. Relationship of school with the community

4.2.1. How far is the school located away from the nearest community

1. More than 7km	2. 4-6km	3. 1-3km	4. Less than 1km	5. In community	Choice

4.2.2. School used as evacuation for surrounding communities

1. Not used	2. Poor	3. Medium	4. Good	5. Very good	Choice

4.2.3. How often does the school participated in disaster related programs/activities held in communities (disaster drill, town watching, cleaning after disaster, etc.)

1. Not participate	2. Less than Once per year	3. Once per year	4. twice per year	5. More than twice per year	Choice

4.2.4. Availability of support from local community emergency response team

1. Not available	2. Poor	3. Medium	4. Good	5. Very good	Choice

4.2.5. School involvement in disaster management planning of local community

1. Not involve	2. Poor	3. Medium	4. Good	5. Very good	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

4.2.1	4.2.2	4.2.3	4.2.4	4.2.5

4.3. Mobilizing fund

4.3.1. Fund support from the Government specific on disaster activities in 2010

1. Not available	2. Less than 5 million VND	3. 5-20 million VND	4. 20-40 million VND	5. More than 40 million VND	Choice

4.3.2. Ability to mobilize funds from parent-teacher association (PTA) after 2010 disaster

1. Not able	2. Less than 2 million	3. 2-5 million VND	4. 5-10 million VND	5. More than 10 million VND	Choice

4.3.3. Ability to mobilize funds from local community after 2010 disaster

1. Not able	2. Less than 2 million	3. 2-5 million VND	4. 5-10 million VNDs	5. More than 10 million VND	Choice

4.3.4. Ability to mobilize funds from other organizations, NGOs, private organizations,…after 2010 disaster

1. Not able	2. Less than 5 million	3. 5-20 million VND	4. 20-40 million VND	5. More than 40 million VND	Choice

4.3.5. Shifting budget for disaster activities (financial allocations to disaster and education can get affected by other demands, etc.)

1. More than 21%	2. 11-20%	3. 5-10%	4. Less than 5%	5. Not shift	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

4.3.1	4.3.2	4.3.3	4.3.4	4.3.5

At the end of this part, please weigh each parameter by ranking them between 1 and 3 (3 = very important, 1 = not important)

Collaboration	Relationship of school with the community	Mobilizing fund

5. Part 5 – Natural conditions of school

5.1. Severity of natural hazards

5.1.1. Floods

1. Very severe	2. Severe	3. Not severe	4. Normal	5. Not affected	Choice

5.1.2. Storms (strong wind)

1. Very severe	2. Severe	3. Not severe	4. Normal	5. Not affected	Choice

5.1.3. Heat waves

1. Very severe	2. Severe	3. Not severe	4. Normal	5. Not affected	Choice

5.1.4. Seawater intrusion

1. Very severe	2. Severe	3. Not severe	4. Normal	5. Not affected	Choice

5.1.5. Drought (water scarcity)

1. Very severe	2. Severe	3. Not severe	4. Normal	5. Not affected	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

5.1.1	5.1.2	5.1.3	5.1.4	5.1.5

5.2. Frequency of natural hazards

5.2.1. Floods

1. More than Once per year	2. Once per year	3. Once every five years	4. Once in more than five years	5. Never occurred	Choice

5.2.2. Storms (strong wind)

1. More than Once per year	2. Once per year	3. Once every five years	4. Once in more than five years	5. Never occurred	Choice

5.2.3. Heat waves

1. More than Once per year	2. Once per year	3. Once every five years	4. Once in more than five years	5. Never occurred	Choice

5.2.4. Seawater intrusion

1. More than Once per year	2. Once per year	3. Once every five years	4. Once in more than five years	5. Never occurred	Choice

5.2.5. Drought (water scarcity)

1. More than Once per year	2. Once per year	3. Once every five years	4. Once in more than five years	5. Never occurred	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

5.2.1	5.2.2	5.2.3	5.2.4	5.2.5

5.3. Surrounding environment

5.3.1. Location of school in risk area

1. In the high risk zone	2. In the risk zone	3. Not so risk zone	4. Normal zone	5. Safe zone	Choice

5.3.2. How far is the school located from the nearest river/stream/sea

1. Less than 1km	2. 1-5km	3. 6-10km	4. 11-20km	5. More than 20 km	Choice

5.3.3. How far is the school located from the local People Committee office?

1. More than 15km	2. 11-20km	3. 6-10km	4. 1-5km	5. Less than 1km	Choice

5.3.4. How far is the school located from the local police station?

1. More than 15km	2. 11-20km	3. 6-10km	4. 1-5km	5. Less than 1km	Choice

5.3.5. How far is the school located from the hospital/health center?

1. More than 15km	2. 11-20km	3. 6-10km	4. 1-5km	5. Less than 1km	Choice

Weight factor Please rank the variables between 1 and 5 (5 = most important, 1 = least important)

5.3.1	5.3.2	5.3.3	5.3.4	5.3.5

At the end of this part, please weigh each parameter by ranking them between 1 and 3 (3 = very important, 1 = not important)

Severity of natural hazards	Frequency of natural hazards	Surrounding environment

Appendix 2 – Explanatory note for questionnaire

Part 1 – Physical condition

1.1 School buildings

1.1.2 The extent of application of safety building codes

Poor: 1-25% of safety building codes applied

Medium: 26-50% of safety building codes applied

Good: 51-75% of safety building codes applied

Very good: 76-100% of safety building codes applied

1.1.3 The use of emergency exit door

Poor: existence but no use

Medium: use but no checked and improved for more than 5 years

Good: regular use and improved 3-5 years ago

Very good: regular use and periodically improved (1-2 years)

1.1.4 The safety level and capacity of emergency shelter in school

Poor: only enough for under 50 people and not safe, easy to be collapsed

Medium: enough for under 200 people, and possibly be collapsed

Good: enough for up to 400 people, safe but possibly be collapsed during severe disasters

Very good: enough for more than 400 people, very safe and no collapse was recorded before

1.1.5 The extent of affected level of school buildings by disasters in 2010

Very severe: completely collapsed

Severe: partly collapsed or wall cracked

Be affected but not severe: windows or doors broken

Slightly affected: submerged without damage of inside structure

1.2 Facilities and equipment

1.2.3 The extent of emergency supplied

Poor: only enough for 1-25% students, teachers and staff of school

Medium: only enough for 26-50% students, teachers and staff of school

Good: enough for 51-75% students, teachers and staff of school

Very good: enough for 76-100% students, teachers and staff of school

1.3 Hygienic and environmental conditions

1.3.3 The exent of apllication of food safety standards issued by Ministry of health in school

Poor: 1-25% of food safety standards applied

Medium: 26-50% of food safety standards applied

Good: 51-75% of food safety standards applied

Very good: 76-100% of food safety standards applied

1.3.5 Amount of garbage which is reused or recycled

Poor: 1-25% of the total amount of garbage is reused or recycled

Medium: 26-50% of the total amount of garbage is reused or recycled

Good: 51-75% of the total amount of garbage is reused or recycled

Very good: 76-100% of the total amount of garbage is reused or recycled

Part 2 – Human resource

2.1 Teachers and staff

2.1.5 The sharing level of school emergency procedure and disaster preparedness plan to teachers and staff

Poor: only teachers and staff in school board understand about school emergency procedure and disaster preparedness plan

Medium: about 50% of teachers and staff understand about school emergency procedure and disaster preparedness plan but not updated

Good: 55-80% of teachers and staff understand about school emergency procedure and disaster preparedness plan and regular update

Very good: 81-100% of teachers and staff understand about school emergency procedure and disaster preparedness plan and regular update

2.2 Students

2.2.5 The sharing level of school emergency procedure and disaster preparedness plan to students

Poor: only students in class board understand about school emergency procedure and disaster preparedness plan

Medium: about 50% of students understand about school emergency procedure and disaster preparedness plan and not updated

Good: about 50-80% of students understand about school emergency procedure and disaster preparedness plan and regular update

Very good: about 81-100% of students understand about school emergency procedure and disaster preparedness plan and regular update

2.3 Parents/guardians

2.3.3 The extent of communication betwwen school and family in emergency situtations

Poor: occasionally

Medium: right at the time disasters occur

Good: before and right at the time disasters occur

Very good: before, during and after the time disasters occur

2.3.4 The sharing level of school emergency procedure and disaster preparedness plan to parents/guardians

Poor: only parents in PTA association board understand about school emergency procedure and disaster preparedness plan

Medium: about 50% of parents understand about school emergency procedure and disaster preparedness plan and not updated

Good: about 50-80% of parents understand about school emergency procedure and disaster preparedness plan and regular update

Very good: about 81-100% of parents understand about school emergency procedure and disaster preparedness plan and regular update

2.3.5 The number of disaster acitivites with participation and support from parents

Poor: 1-25% of the total number of disaster acitivites

Medium: 26-50% of the total number of disaster acitivites

Good: 51-75% of the total number of disaster acitivites

Very good: 76-100% of the total number of disaster acitivites

Part 3 – Institutional issue

3.1 Planning

3.1.1 The extent of incorportation of disaster related contents into school planning

Poor: 1-25% of the activities in school plan incorporated

Medium: 26-50% of the activities in school plan incorporated

Good: 51-75% of the activities in school plan incorporated

Very good: 76-100% of the activities in school plan incorporated

3.1.2 The extent of incorportation of disaster related contents into school regulation

Poor: 1-25% of the activities in school regulation incorporated

Medium: 26-50% of the activities in school regulation incorporated

Good: 51-75% of the activities in school regulation incorporated

Very good: 76-100% of the activities in school regulation incorporated

3.1.3 The extent of incorportation of disaster related contents into school syllabus

Poor: 1-25% of the subjects incorporated

Medium: 26-50% of the subjects incorporated

Good: 51-75% of the subjects incorporated

Very good: 76-100% of the subjects incorporated

3.1.4 Effectiveness of implementation of school disaster preparedness and emergency plan

Poor: only effective for medium/small disasters

Medium: mostly effective when disasters

Good: fully effective with the good cooperation between staff, teachers, students and parent when disasters occur

Very good: fully effective with the good cooperation between staff, teachers, students and parent even when severe disasters occur

3.1.5 Effectiveness of implementation of school recovery plan after disasters

Poor: only effective for medium/small disasters

Medium: mostly effective when disasters

Good: fully effective and school can quickly catch up with the schedule after disasters

Very good: fully effective and school can quickly catch up with the schedule even after severe disasters ocur

3.2 Management

3.2.1 Percentage of students were warned before disasters occur

Poor: 1-25% of students were warned before disasters occur

Medium: 26-50% of students were warned before disasters occur

Good: 51-75% of students were warned before disasters occur

Very good: 76-100% of students were warned before disasters occur

3.2.2 Amount of disaster books and newspapers supplied for students

Poor: there are very few disasters books and newspapers in school

Medium: there are some disasters books and newspapers in school at basic level

Good: there are many kinds of disasters books and newspapers from basic to advance level

Very good: there are many kinds of disasters books and newspapers from basic to advance level and regular updated

Part 4 – External relationship

4.1 Collaboration

4.1.3 The extent of sharing disaster related information within school and between school with other institutions

Poor: occasionally

Medium: shared but not updated

Good: shared but not regular updated

Very good: shared and regular updated

4.1.4 Early warning system from local authority to school

Poor: only some hours before disaster occurs

Medium: 1 day before disaster occurs

Good: more than 3 days before disaster occurs

Very good: more than 7 days before disaster occurs

4.1.5 The extent of support from local authority

Poor: occasionally

Medium: school only received some technical help when severe disasters (such as flood in 1999, or storm in 2006,..) occured

Good: school received technical help (assistance, food, drug,..) and financial support only when severe disasters (such as flood in 1999, or storm in 2006,..) occured

Very good: school received technical help (assistance, food, drug,..) and financial support everytime disasters occured

4.2 Relationship between school and community

4.2.2 The use of school as shelter for community during disasters

Poor: only in medium disasters

Medium: can be used by few people in case of severe disasters

Good: can be used by many people in case of severe disasters

Very good: can be used by many people in case of severe disasters with supplies of emergency tools, food, drink,...

4.2.4 The extent of support from local emergency response team

Poor: occasionally

Medium: school only received some technical help when severe disasters (such as flood in 1999, or storm in 2006,..) occured

Good: school received technical help (assistance, food, drug,..) and financial support only when severe disasters (such as flood in 1999, or storm in 2006,..) occured

Very good: school received technical help (assistance, food, drug,..) and financial support everytime disasters occured

4.2.5 The extent of participation of school in disaster management plan of local community

Poor: school was informed about disaster management plan of local community

Medium: school played a limited role in disaster management plan of local community

Good: school participated in set up and cooperated with local community to implement the disaster management plan of local community

Very good: school participated in all stages from planning, implementation, investigation and improvement of local community's disaster management plan

Part 5 – Natural conditions

5.1 Severity of natural hazard

5.1.1 Floods

Very severe: floods often longs more than 7 days

Severe: floods often longs about 2-6 days

Not severe: floods often longs not more than 2 days

Normal: floods often occured in 24 hours

5.1.2 Storms (strong wind)

Very severe: Wind level is from 12 to 17 (118 – 220 km/h)

Severe: Wind level is from 8 to 11 (62 – 117 km/h)

Not severe: Wind level is from 4 to 7 (20 - 61 km/h)

Normal: Wind level is from 0 to 3 (1 - 19 km/h)

5.1.3 Heat waves

Very severe: the average temperature is above 40^{o}C and longs more than 10 days

Severe: the average temperature is above 40^{o}C and longs about 7-10 days

Not severe: the average temperature is above 40^{o}C and longs about 3-6 days

Normal: the average temperature is above 40^{o}C and longs not more than 3 days

5.1.4 Sea water intrusion

Very severe: sea level rises more than 3mm/year

Severe: sea level rises about 3mm/year

Not severe: sea level rises lower than 3mm/year

Normal: sea level rises lower than 1mm/year

5.1.5 Droughts (water scarity)

Very severe: no rain for more than 3 months in dry season

Severe: no rain for 1-3 months in dry season

Not severe: no rain for not more than 1 months in dry season

Normal: no rain for not more than 14 days in dry season

5.3 Surrounding environments

5.3.1 Location of school

High risk zone: disasters occur with very high frequency (more than 3 times during 1 months in disaster season)

Risk zone: disasters occur with high frequency (about 1-3 times during 1 months in disaster season)

Not so risk zone: disasters occur with not so high frequency (at least 1 times during disaster season)

Normal zone: disasters occur with low frequency (possibly no disaster occur during disaster season)

Safe zone: no disaster occurs

Appendix 3- Checklist for school

DATA	DESCRIPTION				
Physical/ School Building Condition					
Number of classrooms					
Construction condition	Status				
	Bad	Improved		Good	
Corridor					
Stair					
Window					
Roof					
Wall					
Door					
School facilities	Status				
	Existed	Exist		Not exist	
Health Room					
Kitchen					
Library					
Field/ Empty Space/					
Toilet					
School map					
Evacuation Map					
Evacuation Access					
DRR activities/programs					
Mainstream DRR content into curriculum	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Extra-Curriculum with DRR mainstream					
Emergency supplies (flash, blanket, …)					
Equipment for emergency response (First aid equipment, laud speaker, etc)					
Other DRR activities					

Geographical Condition	
Main hazards	
Situation in Surrounding Area	
Local Disaster History	
Surrounding community(ies)	
Damage by previous disasters	

Appendix 4- Number of schools, classes, classrooms, teachers and students from 2006 to 2012

	2006	2007	2008	2009	2010	2011[1]	2012[2]
Number of schools	**366**	**377**	**381**	**387**	**393**		
Primary	234	235	236	237	229		
Public	234	235	236	236	228		
Non-public	-	-	-	1	1		
Lower secondary	102	103	105	111	116		
Public	102	103	105	111	115		
Non-public	-	-	-	-	1		
Upper secondary	27	31	32	34	36		
Public	22	24	25	28	33		
Non-public	5	7	7	6	3		
Primary and lower secondary					8		
Public	-	-	-	-	8		
Non-public	-	-	-	-	-		
Lower and upper secondary	5	8	8	5	4		
Public	5	8	8	5	4		
Non-public	-	-	-	-	-		
Number of classes	**7,240**	**7,157**	**7,050**	**7,011**	**6,886**		
Primary	3,724	3,663	3,527	3,543	3,500		
Public	3,724	3,663	3,527	3,542	3490		
Non-public	-	-	-	1	10		
Lower secondary	2,484	2,477	2,423	2,395	2,320		
Public	2,484				2,316		
Non-public	-	-	-	-	4		
Upper secondary	1,032	1,047	1,055	1,073	1,066		
Public	803	833	873	903	1,020		
Non-public	229	214	182	170	46		
Number of classrooms	**5,524**	**5,661**	**5,733**	**5,617**	**5,388**		
Primary	3,172	3,236	3,260	3,101	3,219		
Public	3,172	3,236	3,260	3,091	3,195		
Non-public	-	-	-	10	24		
Lower secondary	1,644	1,696	1,838	1,635	1,424		
Public	1,644	1,696	1,838	1,635	1,414		
Non-public	-	-	-	-	10		
Upper secondary	708	729	635	881	745		
Public	559	600	538	760	703		
Non-public	149	129	97	121	42		
Number of teachers	**10,569**	**11,261**	**11,356**	**11,696**	**12,114**		
Primary	4,443	4,493	4,541	4,771	4,964		
Public	4,443	4,493	4,541	4,764	4,932		
Non-public	-	-	-	7	32		
Lower secondary	4,356	4,528	4,675	4,650	4,685		
Public	4,356	4,528	4,675	4,650	4,649		
Non-public	-	-	-	-	36		
Upper secondary	1,770	2,240	2,140	2,275	2,465		
Public	1,658	1,894	1,920	2,041	2,322		
Non-public	112	346	220	234	143		
Number of students	**256,963**	**247,395**	**237,868**	**230,100**	**224,170**		
Primary	111,613	106,061	101,412	100,061	98,584		
Public	111,613	106,061	101,412	100,055	98,444		
Non-public	-	-	-	6	140		
Lower secondary	99,321	95,075	90,961	85,005	80,008		
Public	99,321	95,075	90,961	85,005	79,906		
Non-public	-	-	-	-	102		
Upper secondary	46,029	46,259	45,495	45,034	45,578		
Public	35,446	36,094	37,064	38,135	43,559		
Non-public	10,583	10,165	8,431	6,899	2,019		
Rate of drop-out (per cent)	**4.37**	**7.32**	**7.4**	**5.7**	**3.9**		
Primary	1.31	2.07	2.3	0.8	0.8		
Lower secondary	5.98	10.16	9.15	9.4	6.3		
Upper secondary	8.33	13.53	12.4	9.4	6.5		

[1] As of 2013 by GSO

[2] As of 2013 by GSO

Appendix 5 – SDRA analysis in Hue Province by districts

		Overall	Physical condition				Human resource				Institutional issue				External relationship				Natural condition			
			1.1	1.2	1.3		2.1	2.2	2.3		3.1	3.2	3.3		4.1	4.2	4.3		5.1	5.2	5.3	
1	**Hue city**	3.25	3.78	3.08	4.19	3.69	3.50	3.61	3.19	3.47	3.87	3.11	2.57	3.26	3.28	3.88	2.24	3.26	2.49	2.25	3.33	2.60
2	**Huong tra**	3.13	3.40	2.82	3.81	3.38	3.71	3.98	3.01	3.57	3.95	3.08	2.31	3.23	3.09	3.89	1.94	2.90	2.46	2.00	3.29	2.58
3	**Huong Thuy**	3.08	3.22	2.45	3.48	3.14	3.43	3.72	3.14	3.52	3.52	3.00	2.15	2.95	3.36	3.77	1.87	3.09	2.56	2.13	3.54	2.75
4	**Phu Vang**	2.95	2.91	2.75	3.39	3.16	3.47	3.37	2.66	3.31	3.56	3.00	2.07	2.98	3.19	3.47	1.68	2.87	2.31	1.87	3.31	2.46
5	**Quang Dien**	3.10	3.10	2.78	3.38	3.11	3.58	3.38	2.67	3.25	3.66	3.03	2.88	3.26	3.42	3.63	2.26	3.29	2.35	1.96	3.59	2.45
6	**Nam Dong**	3.26	3.57	3.34	4.27	3.69	3.44	3.48	3.30	3.44	3.41	2.92	2.73	3.14	3.61	3.80	2.31	3.27	2.42	1.91	3.32	2.79
7	**Phu Loc**	3.02	3.31	2.57	3.88	3.32	3.66	3.57	2.87	3.43	3.76	3.06	2.19	3.05	3.18	3.88	1.79	3.04	2.02	1.77	3.10	2.29
8	**Phong Dien**	3.18	3.22	3.05	3.84	3.47	3.29	3.61	2.98	3.31	3.82	3.22	2.11	3.15	3.41	3.89	2.20	3.18	2.66	2.45	3.23	2.79
9	**A Luoi**	2.97	2.98	2.30	3.58	3.01	3.34	3.39	2.83	3.17	3.60	2.88	2.19	2.97	2.64	3.72	1.96	2.76	3.20	2.44	3.12	2.95
		3.09	**3.26**	**2.84**	**3.68**	**3.32**	**3.47**	**3.53**	**2.93**	**3.36**	**3.66**	**3.06**	**2.39**	**3.12**	**3.25**	**3.69**	**2.09**	**3.08**	**2.44**	**2.13**	**3.29**	**2.59**

Appendix 6- SDRA of 218 primary schools in Thua Thien Hue Province

			Physical condition				Human resource				Institutional issue				External relationship				Natural condition				SDRA
District	No	School names	P1	P2	P3	AVE	H1	H2	H3	AVE	I1	I2	I3	AVE	E1	E2	E3	AVE	N1	N2	N3	AVE	
Hue City	1	An Cuu	4.20	4.73	4.73	4.56	4.73	3.67	4.73	4.38	5.00	4.60	2.93	4.52	4.80	4.93	2.60	4.50	4.13	1.80	3.60	3.48	4.29
Hue City	2	An Hoa	3.47	2.20	3.80	3.37	2.27	2.40	3.27	2.67	4.00	3.47	2.20	3.13	2.80	3.53	2.07	3.04	1.27	3.40	3.40	2.33	2.91
Hue City	3	Huong Long	3.93	3.33	4.40	4.07	2.73	2.13	2.27	2.36	3.33	3.00	2.00	2.83	3.27	3.60	2.07	3.23	2.47	1.40	3.27	2.07	2.91
Hue City	4	Huong So	3.53	3.13	4.13	3.53	3.27	3.20	2.07	3.04	3.20	1.93	2.73	2.41	2.20	3.67	1.27	2.78	2.00	2.73	3.60	2.51	2.86
Hue City	5	Le Loi	4.40	4.00	4.33	4.26	4.13	3.67	3.20	3.82	4.47	3.67	2.47	3.87	3.80	4.07	3.53	3.84	3.07	2.33	2.93	2.80	3.72
Hue City	6	Le Quy Don	4.20	3.20	3.87	3.92	3.33	3.33	3.13	3.30	2.67	3.53	3.80	3.14	3.00	4.40	1.33	2.63	3.93	3.80	2.87	3.56	3.31
Hue City	7	Ly Thuong Kiet	4.07	4.13	4.87	4.34	4.53	4.67	4.07	4.52	4.13	3.87	3.60	3.96	3.13	4.00	2.60	3.39	2.53	1.60	3.93	2.84	3.81
Hue City	8	Ngo Kha	3.87	3.67	3.67	3.77	4.47	3.00	3.33	3.41	4.27	2.33	3.13	3.57	2.47	2.87	2.87	2.67	1.40	1.87	2.87	1.80	3.04
Hue City	9	Ngu Binh	3.87	3.33	4.00	3.82	4.87	4.87	3.93	4.71	4.00	2.80	3.93	3.59	3.40	4.40	1.00	2.53	3.93	3.80	3.87	3.89	3.71
Hue City	10	Nguyen Trai	4.20	2.60	3.33	3.52	2.53	2.60	2.40	2.53	3.60	1.60	1.60	2.60	2.13	2.33	2.33	2.27	4.40	3.40	4.33	3.88	2.96
Hue City	11	Phu Binh	3.67	2.47	5.07	3.50	4.20	4.27	2.47	3.93	3.93	2.33	2.93	3.23	3.60	4.53	2.73	3.92	2.53	2.60	2.93	2.74	3.47
Hue City	12	Phu Cat	3.87	4.20	4.47	4.12	4.60	3.73	3.73	4.17	4.00	3.53	2.00	3.51	3.80	3.87	3.00	3.70	3.53	1.40	3.27	3.09	3.72
Hue City	13	Phu Hau	4.07	2.40	4.00	3.48	3.33	4.80	2.93	3.76	3.87	2.73	1.73	3.13	3.80	4.67	1.80	3.28	2.20	1.27	2.93	2.01	3.13
Hue City	14	Phu Hoa	4.60	3.00	4.53	3.78	2.40	3.20	2.60	2.87	3.80	1.80	1.67	2.07	3.33	3.20	3.47	3.38	2.13	1.47	3.13	2.08	2.83
Hue City	15	Phu Luu	3.60	2.53	3.27	2.96	2.00	4.20	2.53	3.19	4.20	2.87	2.40	3.46	3.40	4.53	3.47	3.98	2.07	1.40	2.20	1.87	3.09
Hue City	16	Phu Thuan	2.60	3.00	3.87	3.09	4.40	3.00	3.93	3.62	4.00	3.47	1.60	2.71	2.93	4.20	2.00	2.89	1.40	1.67	3.20	1.79	2.82
Hue City	17	Phước Vinh	3.13	2.67	4.73	3.59	4.73	4.73	2.67	4.39	3.80	3.47	4.53	4.11	3.93	4.33	4.33	4.27	2.47	1.27	3.27	2.20	3.71
Hue City	18	Phuong Duc	3.87	2.93	3.40	3.56	3.20	3.87	3.80	3.52	3.73	3.53	3.40	3.61	3.20	4.07	2.87	3.43	2.67	2.93	2.73	2.77	3.38
Hue City	19	So 1 An Dong	3.60	3.67	4.07	3.84	2.67	3.33	2.67	2.78	4.00	2.87	1.60	2.61	3.73	4.07	1.80	3.52	3.40	2.00	3.60	2.97	3.14
Hue City	20	So 1 Kim Long	2.60	2.53	4.73	2.93	2.13	1.80	2.80	2.13	3.60	3.00	3.73	3.42	4.33	3.53	1.47	3.46	1.80	2.07	2.60	2.11	2.81
Hue City	21	So 2 An Dong	3.53	2.27	2.93	2.70	3.33	3.67	3.67	3.50	4.53	3.47	2.27	3.22	2.00	3.27	1.27	2.39	2.00	2.00	2.53	2.09	2.78
Hue City	22	So 2 Kim Long	4.13	1.87	4.33	3.86	4.07	4.20	2.40	3.86	3.87	2.07	1.93	2.94	2.33	3.27	1.87	2.64	3.00	3.00	4.07	3.18	3.30
Hue City	23	Tay Loc	3.60	3.13	4.40	3.58	3.13	3.67	3.67	3.49	2.60	3.07	3.67	3.01	3.47	3.87	1.87	3.40	3.27	3.67	3.93	3.56	3.41
Hue City	24	Thanh Long	4.20	2.67	3.33	3.26	3.40	3.60	2.60	3.33	4.60	3.60	3.13	3.86	3.80	4.73	3.07	4.02	3.47	2.13	3.07	3.04	3.50
Hue City	25	Thuan Hoa	3.40	4.07	4.73	3.84	3.80	3.53	3.33	3.60	3.47	3.07	1.00	2.44	3.87	4.13	1.93	3.36	3.40	1.67	4.07	3.16	3.28
Hue City	26	Thuan Loc	2.73	3.13	4.47	3.38	4.07	3.87	3.67	3.90	4.67	3.47	1.00	2.84	3.40	2.73	2.27	2.69	1.40	2.73	2.53	2.03	2.97
Hue City	27	Thuan Thanh	4.53	2.67	4.47	4.20	2.13	2.27	2.80	2.31	3.13	2.60	2.07	2.78	1.80	3.53	1.60	2.60	1.53	1.53	3.27	2.11	2.80
Hue City	28	Thuy Bieu	4.33	3.00	3.67	3.56	2.00	4.27	2.80	2.89	4.13	3.93	2.07	3.72	2.67	3.67	2.00	3.06	1.73	2.47	3.33	2.39	3.12
Hue City	29	Thuy Xuan	2.33	2.53	4.07	2.72	3.67	3.33	2.20	3.01	2.33	2.00	1.93	2.10	2.73	3.13	1.47	2.38	3.07	1.67	4.13	2.78	2.60
Hue City	30	Tran Quoc Toan	3.00	3.13	4.73	3.36	3.87	3.73	3.73	3.78	3.73	3.07	2.07	2.79	3.07	4.93	1.87	3.80	1.27	1.93	3.53	2.13	3.17
Hue City	31	Trieu Son Tay	4.40	3.60	4.60	4.33	4.07	4.20	3.47	3.89	4.47	3.47	4.40	4.28	3.27	3.33	1.67	3.03	1.60	1.53	2.87	1.78	3.46
Hue City	32	Truong An	3.73	2.87	4.20	3.74	4.07	4.40	3.60	4.16	4.53	4.00	2.53	4.02	4.00	4.13	1.87	3.36	2.40	2.13	3.73	2.53	3.56
Hue City	33	Vinh Loi	3.20	3.53	4.73	4.02	3.60	3.60	3.87	3.64	4.27	3.07	2.40	3.56	4.00	4.07	2.73	3.61	2.00	3.67	3.27	2.77	3.52
Hue City	34	Vinh Ninh	4.13	3.13	4.27	3.87	3.80	4.13	3.20	3.66	4.13	2.53	3.33	3.60	3.13	4.00	2.20	3.41	1.40	2.20	3.93	2.09	3.32
Hue City	35	Vy Da	4.13	3.20	4.87	4.22	4.07	4.07	3.67	3.93	3.13	4.13	2.73	3.17	4.07	4.20	2.80	3.92	1.87	2.33	3.27	2.33	3.52
Hue City	36	Xuan Phu	4.80	2.87	3.67	4.10	2.27	3.13	3.53	2.91	4.07	3.87	2.07	3.67	3.33	3.87	1.60	3.02	2.73	2.00	3.93	3.01	3.34
Huong Tra	1	Bình Điền	3.20	2.93	2.73	2.91	2.67	2.80	2.33	2.66	3.00	2.47	1.27	2.33	2.87	3.53	2.47	3.13	2.47	1.53	3.47	2.17	2.64
Huong Tra	2	Bình Thành	3.27	3.00	3.00	3.04	3.13	2.47	2.73	2.71	3.00	2.93	3.13	3.03	3.60	3.13	2.27	2.86	3.27	2.53	3.73	3.10	2.95
Huong Tra	3	Hương Bình	2.80	2.73	2.47	2.71	1.93	3.27	3.07	2.57	4.00	2.07	1.00	2.18	3.53	2.93	1.00	2.81	2.87	2.33	4.27	3.39	2.73
Huong Tra	4	Hương Chữ	4.27	3.47	4.73	4.29	3.80	4.60	3.53	3.84	4.00	3.93	3.13	3.70	3.27	4.13	1.27	2.74	2.80	2.07	4.13	3.12	3.54
Huong Tra	5	Hương Chữ 2	3.47	3.47	3.27	3.43	3.73	4.53	2.80	3.98	4.60	3.27	3.33	3.96	3.40	3.33	2.20	3.18	3.33	1.73	3.33	2.53	3.42
Huong Tra	6	Hương Hồ 1	3.80	3.07	4.13	3.79	3.13	3.27	3.20	3.18	3.60	3.07	3.00	3.31	3.07	4.13	1.80	2.82	1.73	4.60	3.40	2.77	3.17

			Physical condition				Human resource				Institutional issue				External relationship				Natural condition				SDRA
District	No	School names	P1	P2	P3	AVE	H1	H2	H3	AVE	I1	I2	I3	AVE	E1	E2	E3	AVE	N1	N2	N3	AVE	
Huong Tra	7	Hương Thọ 1	3.60	3.67	4.47	4.06	3.67	4.07	2.13	3.36	3.93	2.73	1.73	3.00	1.47	4.13	2.07	2.11	2.00	1.53	2.53	1.93	2.89
Huong Tra	8	Hương Toàn 1	3.27	3.20	4.27	3.41	4.27	4.73	3.33	4.34	4.07	3.80	4.53	4.21	4.40	4.27	2.20	3.60	2.13	2.33	3.67	2.97	3.71
Huong Tra	9	Hương Toàn 2	3.20	2.33	3.93	3.30	3.67	4.73	2.73	3.53	4.07	3.07	2.33	3.32	4.00	3.80	2.13	3.34	3.73	1.47	3.53	3.29	3.36
Huong Tra	10	Hương Toàn 3	4.40	2.60	4.07	3.74	4.20	4.60	3.93	4.29	3.80	3.67	3.07	3.61	3.27	4.07	2.13	3.34	3.13	2.00	2.47	2.64	3.53
Huong Tra	11	Hương Vân	2.93	2.53	4.27	3.02	4.33	4.13	3.00	4.01	4.27	1.33	2.80	3.04	2.07	3.27	2.47	2.73	3.93	3.67	4.47	3.89	3.34
Huong Tra	12	Hương Văn 1	2.53	1.27	1.40	1.92	3.33	2.47	2.20	2.81	3.87	1.80	1.13	2.61	1.20	2.67	1.80	1.79	4.20	1.80	3.20	2.83	2.39
Huong Tra	13	Hương Văn 2	3.00	2.87	3.93	3.11	4.33	4.40	3.20	3.78	3.00	3.13	2.80	2.94	3.00	3.60	2.07	2.99	1.67	1.27	2.53	1.68	2.90
Huong Tra	14	Hương Vinh 1	3.47	3.33	2.93	3.16	3.13	2.80	3.07	3.04	3.00	2.60	2.40	2.60	3.13	3.53	2.33	2.87	2.07	1.27	2.47	2.13	2.76
Huong Tra	15	Hương Vinh 2	4.40	3.27	4.07	4.10	3.20	3.53	2.93	3.27	3.60	3.20	3.00	3.20	3.27	3.73	1.27	2.68	1.80	4.00	3.13	3.20	3.29
Huong Tra	16	Hương Vinh 3	2.93	1.20	2.47	2.49	3.80	4.40	1.60	2.80	4.00	1.67	1.00	2.72	2.13	3.87	1.27	2.13	1.40	1.27	2.60	1.78	2.38
Huong Tra	17	Lai Thành	2.00	3.00	3.87	2.79	4.53	4.67	3.60	4.09	4.80	3.33	1.00	3.46	4.67	4.13	1.53	3.53	3.60	2.07	1.80	2.79	3.33
Huong Tra	18	Thái Dương	3.27	2.60	3.73	3.31	3.87	4.27	3.47	3.93	4.00	3.80	2.20	3.37	2.40	3.80	4.07	3.07	1.27	3.20	3.53	2.29	3.19
Huong Tra	19	Thanh Phước	4.80	3.67	4.60	4.54	4.73	4.73	4.73	4.73	5.00	4.60	3.53	4.44	4.00	5.00	1.93	3.48	1.47	1.00	2.73	1.52	3.74
Huong Tra	20	Thuận Hòa	3.13	4.33	5.00	3.96	3.27	3.40	2.87	3.16	4.00	3.27	3.40	3.66	2.73	4.07	2.40	2.84	0.67	0.67	5.33	2.22	3.17
Huong Tra	21	Số 1 Tứ Hạ	3.60	3.07	4.00	3.49	4.40	4.47	2.40	3.74	3.60	2.40	1.00	2.13	3.07	3.40	1.27	2.63	2.93	1.27	2.87	2.37	2.87
Huong Tra	22	Số 2 Tứ Hạ	4.07	0.87	6.27	4.27	4.20	5.60	2.87	4.44	5.33	4.53	1.00	3.76	3.27	6.73	1.07	3.11	4.27	2.27	4.73	4.09	3.93
Huong Tra	23	Vân An	3.47	3.13	3.87	3.42	4.60	4.40	4.27	4.44	4.20	4.13	2.33	3.54	3.27	3.87	2.13	3.38	1.40	1.20	2.40	1.47	3.25
Huong Tra	24	Vân Quật Đông	2.67	2.00	3.87	2.96	3.07	3.27	2.20	2.99	4.00	3.20	1.40	3.30	3.13	4.27	1.33	2.42	1.00	1.00	2.73	1.87	2.71
Huong Thuy	1	TH Cư Chánh	2.40	3.13	3.53	2.90	4.13	4.67	4.67	4.40	3.87	3.73	0.00	2.56	4.67	5.00	1.33	3.61	2.33	3.20	3.67	2.84	3.26
Huong Thuy	2	TH Dạ Lê	2.67	3.27	4.07	3.23	3.40	3.27	3.87	3.59	4.13	3.73	4.13	4.07	3.60	3.47	1.73	3.24	4.20	2.80	3.33	3.30	3.49
Huong Thuy	3	TH Phú Bài 1	1.93	2.07	4.13	2.73	2.73	4.27	2.00	2.88	3.60	1.60	2.07	2.34	4.07	1.80	2.33	3.11	3.13	2.87	4.33	3.20	2.85
Huong Thuy	4	TH Phú Bài 2	3.73	1.67	2.87	3.10	3.33	4.33	1.93	3.03	4.00	3.33	1.33	3.00	2.80	3.93	2.27	2.81	3.07	3.67	3.67	3.37	3.06
Huong Thuy	5	TH Phú Sơn	2.73	1.40	2.60	2.22	3.73	3.07	3.00	3.38	3.20	2.60	1.87	2.78	2.67	4.07	1.27	2.90	2.40	1.27	4.40	2.36	2.73
Huong Thuy	6	TH Thanh Toàn	4.00	2.47	2.87	3.37	3.67	2.67	3.00	4.50	3.40	2.80	1.00	2.50	3.40	4.00	1.53	2.88	2.67	1.53	2.93	2.57	3.16
Huong Thuy	7	TH Thuỷ Bằng	3.67	2.00	3.60	3.37	3.80	4.47	3.53	3.98	3.93	3.67	2.07	2.96	3.40	4.27	2.33	3.66	1.53	1.07	2.33	1.51	3.09
Huong Thuy	8	TH Thuỷ Châu 1	3.67	3.80	3.13	3.62	4.60	4.60	3.93	4.38	4.33	4.13	4.13	4.23	4.27	4.53	2.47	3.71	1.73	1.00	4.60	2.57	3.70
Huong Thuy	9	TH Thuỷ Châu 2	3.13	3.13	4.00	3.42	2.53	3.73	3.13	3.23	3.53	2.20	1.53	2.76	2.87	3.60	1.27	2.97	2.20	1.00	4.47	3.13	3.10
Huong Thuy	10	TH Thuỷ Dương	3.67	2.27	4.40	3.21	3.00	3.20	3.20	3.10	3.00	2.87	3.47	3.13	3.20	3.67	1.27	3.03	1.93	3.07	3.60	2.68	3.03
Huong Thuy	11	TH Thuỷ Lương	2.93	2.73	3.93	3.23	2.13	2.13	2.67	2.31	3.20	1.93	2.00	2.59	3.13	4.00	2.00	2.90	3.60	1.53	3.80	3.32	2.87
Huong Thuy	12	TH Thuỷ Phù 1	3.07	2.27	3.67	3.13	3.07	3.93	3.47	3.63	3.40	2.80	1.00	2.50	3.33	3.60	1.53	2.78	2.67	1.93	2.80	2.59	2.93
Huong Thuy	13	TH Thuỷ Phù 2	2.87	2.07	2.33	2.51	3.33	3.13	2.13	2.70	3.07	2.87	2.93	2.97	3.27	3.67	2.13	2.77	2.80	2.73	3.27	3.01	2.79
Huong Thuy	14	TH Thuỷ Vân	3.87	2.00	3.60	3.47	3.60	3.47	2.60	3.39	3.00	3.00	2.73	2.96	2.73	3.40	2.20	2.98	2.80	3.07	3.07	2.98	3.15
Huong Thuy	15	TH Vân Thê	3.93	2.53	3.47	3.54	4.33	4.87	4.00	4.31	3.13	3.73	2.00	2.86	3.07	3.60	2.40	2.93	1.40	1.20	2.87	1.86	3.10
Phong Dien	1	Bắc Hiên	2.60	1.60	3.53	2.74	3.87	2.40	2.67	3.22	4.00	2.07	2.07	3.03	3.40	3.33	1.40	2.72	2.67	2.60	3.00	2.77	2.90
Phong Dien	2	Bắc Sơn	2.93	2.60	3.00	2.90	3.87	3.73	3.87	3.84	3.27	2.67	2.33	2.86	3.27	3.53	2.47	3.04	2.60	2.07	3.20	2.52	3.03
Phong Dien	3	Điền An	3.53	3.20	4.20	3.76	3.40	3.53	3.73	3.52	3.60	3.53	2.87	3.32	3.27	4.13	1.00	3.32	3.53	1.40	2.93	2.37	3.26
Phong Dien	4	Điền Hải	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Phong Dien	5	Điền Hòa	3.07	2.13	4.00	3.22	2.07	3.73	4.20	3.61	4.00	3.33	1.00	2.28	3.47	3.73	1.00	2.78	2.40	2.07	3.27	2.78	2.93
Phong Dien	6	Điền Hương	3.47	3.47	4.53	3.82	4.73	4.40	2.73	4.29	4.00	3.73	1.00	2.96	3.60	4.67	2.13	3.29	2.07	1.27	3.40	2.38	3.35
Phong Dien	7	Điền Lộc	3.80	3.00	3.53	3.58	3.33	4.73	3.20	4.01	4.00	3.80	1.87	3.54	3.93	4.80	1.27	3.92	2.00	2.47	3.27	2.79	3.57
Phong Dien	8	Điền Môn	2.27	2.73	3.93	3.16	4.73	4.07	3.40	4.29	3.53	3.73	3.00	3.54	3.33	3.80	4.40	3.74	3.20	3.20	3.20	3.20	3.59
Phong Dien	9	Đông Hiền	3.40	2.53	3.40	3.11	4.00	3.60	1.53	3.11	3.60	2.87	2.60	3.14	3.40	4.47	1.80	3.04	2.20	2.93	3.13	2.63	3.01
Phong Dien	10	Đông Nam Sơn	2.73	2.73	4.33	3.00	3.47	4.60	1.93	3.14	4.00	2.67	1.87	3.07	3.53	4.07	1.80	3.04	2.67	2.13	2.87	2.64	2.98
Phong Dien	11	Hòa Mỹ	3.20	2.33	4.40	3.66	3.40	3.87	3.73	3.61	3.87	3.27	1.60	3.01	3.53	4.27	2.07	3.41	2.87	2.67	4.40	3.57	3.45

			Physical condition				Human resource				Institutional issue				External relationship				Natural condition				SDRA
District	No	School names	P1	P2	P3	AVE	H1	H2	H3	AVE	I1	I2	I3	AVE	E1	E2	E3	AVE	N1	N2	N3	AVE	
Phong Dien	12	Hương Lâm	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Phong Dien	13	Phò Ninh	3.60	2.53	4.00	3.56	4.13	4.33	3.73	4.03	4.00	3.67	2.07	3.30	3.87	4.13	2.07	3.31	1.60	1.27	3.07	2.03	3.25
Phong Dien	14	Phò Trạch	3.73	2.67	3.47	3.24	0.93	0.00	0.00	0.47	1.67	3.73	2.13	2.43	3.80	3.67	1.87	3.41	1.53	2.00	3.00	1.93	2.30
Phong Dien	15	Phong Chương 1	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Phong Dien	16	Phong Chương 2	3.47	4.00	2.40	3.20	2.93	3.20	1.67	2.86	5.33	3.67	1.07	3.63	2.13	3.47	2.40	2.62	2.33	1.67	4.00	2.78	3.02
Phong Dien	17	Phong Hải	2.33	2.07	3.13	2.56	1.80	2.73	1.80	1.96	4.40	2.53	1.00	2.96	2.87	2.20	1.80	2.11	3.73	3.13	4.00	3.72	2.66
Phong Dien	18	Phong Thu	3.27	2.33	4.33	3.47	3.27	3.13	2.33	2.93	3.80	2.93	1.73	2.97	2.60	3.87	1.80	2.54	2.27	2.13	3.47	2.64	2.91
Phong Dien	19	Phong Xuân	2.53	4.07	3.67	3.68	2.60	6.20	2.80	3.27	3.67	1.80	2.67	3.02	3.33	3.60	1.80	2.87	4.27	3.60	4.33	3.96	3.36
Phong Dien	20	Phước Mỹ	3.33	3.27	3.93	3.50	3.47	4.33	3.60	3.68	4.00	3.00	2.00	3.17	3.40	3.60	1.67	3.21	2.67	3.20	3.20	2.93	3.30
Phong Dien	21	Tân Mỹ	2.67	3.60	2.80	3.18	2.60	3.33	3.33	2.97	4.00	3.47	2.00	3.49	3.53	4.13	1.67	3.01	2.40	3.20	2.80	2.73	3.08
Phong Dien	22	Tây Hiền	3.80	3.00	4.93	3.72	2.87	3.20	2.73	2.96	3.87	2.80	1.33	3.09	3.80	3.40	1.27	3.24	2.80	1.27	2.47	2.23	3.05
Phong Dien	23	Trạch Phổ	3.73	2.67	4.73	4.06	3.60	4.40	3.33	3.82	4.00	3.80	2.53	3.69	3.40	4.13	2.60	3.24	1.87	1.80	3.00	2.23	3.41
Phong Dien	24	Trần Q Toản	2.87	2.93	3.73	3.31	2.00	3.60	2.47	2.42	3.47	2.20	1.27	2.52	3.20	4.40	1.40	2.80	2.87	2.27	3.33	2.92	2.80
Phong Dien	25	Ưu Điểm	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Phong Dien	26	Vân Trình	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Phong Dien	27	Vĩnh Hòa	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Quang Dien	1	So 1 Quang An	3.53	4.33	4.60	4.29	4.73	4.73	3.87	4.44	4.93	4.07	3.93	4.46	4.33	5.00	2.80	4.41	1.33	1.00	3.87	1.59	3.84
Quang Dien	2	Số 2 Quảng An	2.87	2.53	3.87	3.14	2.73	3.53	2.07	2.64	3.67	2.60	2.60	3.13	3.87	4.67	2.67	4.07	1.40	1.00	2.53	1.39	2.88
Quang Dien	3	Số 1 Quảng Công	2.73	3.27	4.27	3.33	3.40	3.13	2.67	3.11	4.00	4.20	4.87	4.32	3.87	4.73	2.33	4.04	2.00	1.00	4.27	1.88	3.34
Quang Dien	4	Số 2 Quảng Công	2.47	3.07	3.40	2.88	2.80	2.00	2.27	2.49	4.20	3.00	2.27	3.36	2.33	4.07	2.33	3.20	1.53	1.53	3.87	1.92	2.77
Quang Dien	5	Số 1 Quảng Lợi	3.93	2.67	3.67	3.63	3.60	3.20	3.00	3.33	3.80	3.07	1.80	3.01	3.47	3.73	2.33	3.41	2.80	1.33	3.80	2.23	3.12
Quang Dien	6	Số 2 Quảng Lợi	2.27	2.93	3.27	2.71	3.33	2.47	1.60	2.61	4.20	2.47	3.33	3.62	4.00	3.33	1.73	3.29	2.20	2.20	3.40	2.40	2.93
Quang Dien	7	Số 1 Quảng Ngạn	2.40	2.53	2.00	2.29	3.00	1.93	2.33	2.60	1.33	1.33	1.00	1.22	2.60	3.87	1.00	2.97	1.60	1.53	2.40	1.70	2.16
Quang Dien	8	Số 2 Quảng Ngạn	2.20	2.07	4.00	2.78	3.27	2.93	1.00	2.46	4.00	2.00	3.47	3.49	2.40	2.73	2.00	2.50	3.00	2.40	3.40	2.77	2.80
Quang Dien	9	Số 1 Quảng Phú	2.53	2.67	2.47	2.53	4.20	4.53	2.67	3.74	3.20	3.13	1.73	2.70	3.33	3.40	2.40	3.21	3.13	3.67	3.40	3.44	3.13
Quang Dien	10	Số 2 Quảng Phú	3.13	3.20	4.40	3.78	3.73	3.47	3.00	3.52	3.93	3.33	2.53	3.40	3.53	4.13	2.47	3.48	2.27	3.07	2.87	2.60	3.36
Quang Dien	11	Số 3 Quảng Phú	3.27	2.60	2.53	2.91	3.73	2.87	3.47	3.50	3.40	3.33	1.80	2.86	4.80	4.00	2.00	3.93	4.13	2.33	4.20	3.24	3.29
Quang Dien	12	Số 1 Quảng Phước	4.87	3.47	4.53	4.11	4.20	4.27	3.93	4.19	4.00	3.73	4.40	4.09	4.20	4.60	1.20	3.40	1.80	1.20	4.73	3.17	3.79
Quang Dien	13	Số 2 Quảng Phước	2.93	3.07	3.47	3.13	4.13	4.07	3.07	3.77	3.33	2.87	2.67	3.03	2.27	3.00	2.27	2.63	2.20	1.80	3.33	2.19	2.95
Quang Dien	14	TH Quảng Thái	3.47	2.67	3.67	3.40	3.60	3.07	2.40	3.11	3.67	3.33	1.80	2.99	3.80	3.80	2.53	3.59	1.20	1.67	3.33	1.79	2.98
Quang Dien	15	Số 1 Quảng Thành	3.20	2.20	2.27	2.72	3.20	2.93	3.13	3.13	3.27	2.53	3.93	3.37	2.93	2.47	2.67	2.66	2.60	2.33	3.67	2.64	2.90
Quang Dien	16	Sô2 Quảng Thành	2.87	1.93	2.20	2.49	4.33	3.07	2.87	3.63	3.13	3.20	2.20	2.83	3.33	2.60	2.67	2.86	2.93	1.80	3.73	2.50	2.86
Quang Dien	17	Số 3 Quảng Thành	2.13	2.47	2.33	2.26	3.47	3.33	1.80	2.89	3.00	2.60	4.20	3.33	2.93	3.47	2.07	3.06	3.80	3.13	4.07	3.51	3.01
Quang Dien	18	Số 1 Quảng Thọ	1.93	2.60	4.27	2.82	4.27	4.00	3.27	3.89	4.00	3.73	3.00	3.62	4.20	4.60	1.00	3.87	1.73	1.53	3.87	1.99	3.24
Quang Dien	19	Số 2 Quảng Thọ	2.80	3.87	3.53	3.22	4.20	4.00	1.87	3.39	3.60	3.07	2.27	3.07	2.93	2.87	2.00	2.74	1.73	1.53	2.87	1.86	2.86
Quang Dien	20	Số 1 Quảng Vinh	3.53	2.93	3.27	3.34	4.13	3.80	2.60	3.57	4.00	2.87	3.67	3.70	4.00	2.40	3.07	3.04	3.33	2.60	4.00	3.08	3.35
Quang Dien	21	Số 2 Quảng Vinh	3.47	2.33	2.47	2.94	1.80	1.40	2.60	2.00	3.33	2.87	2.13	2.86	2.80	2.07	2.53	2.39	1.33	1.93	2.67	1.86	2.41
Quang Dien	22	Số 1 Thị Trấn Sịa	3.47	2.60	3.87	3.10	3.87	4.47	3.73	3.92	4.00	3.27	4.27	3.68	3.93	4.07	3.80	3.98	3.40	2.47	4.47	3.78	3.69
Quang Dien	23	Số 2 Thị Trấn Sịa	4.40	2.67	3.47	3.80	2.60	4.53	2.20	2.79	4.27	3.00	2.47	2.94	2.80	3.80	2.07	3.01	2.60	2.00	3.73	2.88	3.84
Phu Vang	1	Duong No	2.87	2.40	2.73	2.74	3.00	2.40	1.73	2.59	2.40	2.53	1.87	2.16	2.80	2.73	1.27	2.52	2.00	2.00	3.07	2.18	2.44
Phu Vang	2	Hà Trung	3.60	2.53	3.33	3.33	3.33	3.13	2.67	3.16	3.40	3.47	2.40	2.91	3.80	3.73	1.27	3.36	1.67	1.80	3.20	1.99	2.95
Phu Vang	3	Phú An 1	3.20	2.73	2.73	2.97	3.13	3.73	2.87	3.29	3.93	3.27	2.47	3.09	3.13	2.80	1.53	2.76	1.93	1.73	2.87	1.99	2.82
Phu Vang	4	Phú An 2	3.13	2.27	2.87	2.90	2.00	2.13	2.80	2.18	4.60	3.93	3.47	3.92	3.73	5.00	2.53	3.96	1.20	1.33	2.80	1.53	2.90
Phu Vang	5	Phú Đa 1	3.07	2.27	3.53	2.74	3.47	3.07	3.20	3.22	3.33	2.47	1.33	2.19	3.00	3.00	1.13	2.07	3.07	1.27	3.33	2.26	2.50

			Physical condition				Human resource				Institutional issue				External relationship				Natural condition				SDRA
District	No	School names	P1	P2	P3	AVE	H1	H2	H3	AVE	I1	I2	I3	AVE	E1	E2	E3	AVE	N1	N2	N3	AVE	
Phu Vang	6	Phú Đa 2	3.67	2.60	3.93	3.36	2.67	3.20	2.00	2.73	3.40	2.33	3.47	3.24	1.07	3.73	1.27	2.06	2.80	1.80	3.80	2.47	2.77
Phu Vang	7	Phú Đa 3	2.93	2.67	3.20	2.89	3.67	2.80	2.40	3.17	3.73	3.40	3.67	3.61	3.33	3.80	2.47	3.42	1.80	1.27	2.87	1.80	2.98
Phu Vang	8	Phú Diên	2.53	3.20	2.40	2.82	1.80	2.00	2.53	2.20	2.73	3.00	1.53	2.62	3.60	2.73	2.33	2.96	2.80	1.73	3.33	2.71	2.66
Phu Vang	9	Phú Diên 2	2.13	2.60	2.47	2.48	3.00	3.87	1.93	2.61	2.53	1.87	2.73	2.34	1.53	2.20	2.33	2.00	1.67	1.80	3.40	2.58	2.40
Phu Vang	10	Phú Dương	3.53	4.13	4.53	4.00	4.07	4.07	3.33	3.82	4.00	3.47	5.00	3.99	2.80	4.00	1.87	3.09	2.20	1.00	3.13	1.76	3.33
Phu Vang	11	Phú Hải	3.93	2.73	3.87	3.71	4.33	4.40	3.53	4.22	4.60	3.13	2.13	3.53	3.80	4.33	1.27	3.64	2.93	1.67	2.87	2.50	3.52
Phu Vang	12	Phú Hồ	2.73	2.47	2.53	2.53	3.53	3.53	1.93	3.00	2.87	2.93	2.60	2.76	3.13	3.73	2.87	3.10	3.33	2.60	4.07	3.09	2.90
Phu Vang	13	Phú Lương 1	3.00	3.27	4.60	3.58	4.13	4.07	3.87	4.06	4.53	3.87	1.00	3.24	3.93	4.13	2.33	3.43	2.47	3.27	4.20	3.60	3.58
Phu Vang	14	Phú Lương 2	3.93	3.27	4.13	3.89	4.13	4.33	3.60	4.14	4.00	3.93	1.00	2.99	3.87	4.53	2.33	3.47	2.33	2.60	4.20	3.36	3.57
Phu Vang	15	Phú Mậu 1	3.40	3.13	3.33	3.33	4.53	2.33	1.53	3.17	3.20	2.60	1.33	2.48	3.40	2.93	1.40	2.50	2.07	1.00	3.13	2.24	2.74
Phu Vang	16	Phú Mậu 2	3.33	2.47	3.80	2.98	3.00	3.07	2.87	3.00	3.27	2.40	1.67	2.59	3.40	3.60	1.27	3.11	3.47	3.67	2.80	3.46	3.03
Phu Vang	17	Phú Mỹ 1	2.93	3.13	4.20	3.39	4.33	3.87	3.93	4.12	4.53	4.47	2.47	3.83	4.60	3.40	2.13	3.58	2.67	1.93	3.53	2.83	3.55
Phu Vang	18	Phú Mỹ 2	2.13	2.53	3.20	2.73	3.40	3.07	1.87	2.98	2.13	1.53	1.27	1.60	2.33	3.13	2.60	2.78	2.67	1.07	2.53	1.84	2.39
Phu Vang	19	Phú Tân	3.33	2.27	4.00	3.38	3.73	3.73	3.53	3.70	4.47	4.13	1.87	3.92	4.00	4.27	1.27	3.68	1.67	1.00	2.73	1.51	3.24
Phu Vang	20	Phú Thanh	3.33	2.87	4.87	3.77	4.47	4.20	4.00	4.30	3.67	3.13	1.53	3.13	3.73	4.40	1.53	3.70	2.13	1.27	2.87	1.82	3.34
Phu Vang	21	Phú Thuận 1	1.87	2.47	4.07	2.70	4.13	3.20	2.60	3.57	4.00	3.13	3.33	3.60	3.87	4.40	1.00	3.66	2.87	2.47	3.07	2.70	3.24
Phu Vang	22	Phú Thuận 2	3.27	3.60	2.13	4.14	3.27	3.93	2.60	3.81	3.73	3.27	2.13	3.31	2.93	3.07	1.53	2.49	1.87	1.73	3.53	2.68	3.29
Phu Vang	23	Phú Thượng 1	3.27	2.33	2.73	3.71	3.53	3.60	2.80	3.90	2.93	3.07	2.13	2.84	4.27	4.27	1.73	3.42	2.93	1.67	3.13	2.82	3.34
Phu Vang	24	Phú Thượng 2	2.33	3.07	2.80	3.63	1.73	1.73	1.20	1.84	1.00	2.80	1.00	1.60	1.93	1.80	1.27	1.69	1.73	1.00	3.00	2.24	2.20
Phu Vang	25	Phú Xuân 1	3.13	2.40	3.53	3.94	3.67	3.87	3.73	4.37	4.07	3.47	0.00	3.19	3.67	4.20	1.27	2.96	1.60	1.07	3.53	2.48	3.39
Phu Vang	26	Phú Xuân 2	2.20	3.07	3.07	3.66	3.60	3.80	2.73	3.98	4.00	3.20	3.20	3.60	3.27	3.13	1.27	2.58	1.40	3.13	3.27	2.62	3.29
Phu Vang	27	Thuận An 1	2.20	2.73	4.07	2.91	2.20	2.60	2.00	2.20	3.67	3.00	1.00	3.00	2.00	3.47	1.27	2.49	1.80	1.27	2.93	1.81	2.48
Phu Vang	28	Thuận An 2	3.33	2.33	2.67	2.94	2.00	2.73	1.80	2.06	4.00	3.33	1.87	3.42	3.80	2.87	1.13	2.44	1.20	1.33	2.87	1.52	2.48
Phu Vang	29	Vinh An 1	2.47	2.13	3.13	2.69	4.13	4.00	2.00	3.71	4.20	2.47	1.80	2.71	2.73	2.07	1.93	2.13	2.53	2.80	3.87	2.84	2.82
Phu Vang	30	Vinh An 2	3.93	3.67	4.13	3.96	4.40	4.67	4.00	4.42	3.80	3.33	2.00	3.34	3.13	3.27	1.80	2.96	3.00	2.80	3.27	2.98	3.53
Phu Vang	31	Vinh Hà	3.20	3.00	3.60	3.30	3.67	3.93	3.07	3.51	3.87	2.33	2.93	3.20	3.33	4.07	1.27	2.77	3.67	3.40	3.07	3.42	3.24
Phu Vang	32	Vinh Phú	2.33	2.20	3.13	2.58	4.13	3.67	1.80	3.28	4.00	2.87	2.33	3.26	2.13	4.07	1.80	2.34	3.60	1.80	3.53	2.99	2.89
Phu Vang	33	Vinh Thái	1.93	3.53	2.73	2.60	3.67	4.47	2.73	3.91	3.80	2.73	2.40	3.16	3.60	3.47	1.27	2.39	2.00	1.67	4.53	2.26	2.86
Phu Vang	34	Vinh Thanh 1	2.07	2.13	4.20	2.79	3.60	3.00	2.47	3.21	2.60	2.20	2.00	2.33	3.00	3.27	2.00	2.71	1.73	1.00	4.27	2.46	2.70
Phu Vang	35	Vinh Thanh 2	2.13	2.53	2.40	2.29	2.73	2.20	2.13	2.37	3.67	2.27	1.40	2.68	2.87	2.87	1.27	2.60	1.47	1.20	4.33	2.38	2.46
Phu Vang	36	Vinh Xuân 1	2.33	2.47	3.40	2.71	4.27	3.07	3.07	3.67	3.73	2.93	1.27	2.78	3.27	2.40	1.80	2.24	1.53	1.80	2.33	1.76	2.63
Phu Vang	37	Vinh Xuân 2	2.80	2.73	3.40	2.87	3.80	3.07	1.40	2.88	3.40	2.87	1.00	2.02	3.27	3.60	1.53	3.09	3.53	3.20	3.33	3.39	2.85
Phu Loc	1	Cấp 1-2 Bến Ván	2.87	2.93	3.93	3.07	2.80	2.80	3.40	3.00	3.47	1.67	2.00	2.43	1.33	4.27	1.73	2.93	2.07	2.47	2.07	2.20	2.73
Phu Loc	2	Cấp 1-2 Lộc Bình	2.80	2.53	3.53	2.83	4.33	4.00	2.93	3.99	4.00	3.13	3.40	3.61	2.93	3.47	1.80	3.01	2.40	1.07	3.20	1.87	3.06
Phu Loc	3	Cấp 1-2 Lộc Hòa	4.67	3.40	4.67	4.24	3.53	2.40	3.60	3.17	3.87	3.67	2.60	3.56	3.93	3.93	1.40	3.51	3.27	1.47	3.93	3.19	3.53
Phu Loc	4	TH An Lương Đông	3.40	1.93	4.87	3.89	1.80	2.20	2.33	2.09	3.53	2.07	1.33	2.56	3.07	4.53	2.33	3.19	2.20	1.67	3.27	2.20	2.78
Phu Loc	5	TH An Nong 1	3.27	2.00	3.73	3.29	3.80	4.60	2.13	3.92	2.60	1.67	3.93	2.89	2.33	2.60	2.67	2.59	2.53	2.40	3.27	2.61	3.06
Phu Loc	6	TH An Nong 2	4.60	3.00	3.20	3.57	3.27	3.07	2.87	3.10	3.27	2.93	1.80	2.72	2.80	3.67	1.53	2.31	3.80	2.87	4.33	3.76	3.09
Phu Loc	7	TH Bình An	2.87	2.27	2.67	2.50	2.87	2.27	1.13	1.80	3.20	2.53	1.00	1.88	1.13	2.40	1.53	1.48	1.27	2.60	4.13	3.14	2.16
Phu Loc	8	TH Đại Thành	3.40	2.33	3.47	3.24	4.33	4.60	3.53	4.11	4.00	3.93	1.73	3.23	4.93	4.93	1.27	3.71	1.67	1.07	2.20	1.56	3.17
Phu Loc	9	TH Hiền An	2.87	2.80	3.53	3.18	3.27	3.47	2.80	3.10	3.33	2.87	2.27	2.72	3.33	4.13	1.27	2.43	1.80	1.60	2.87	1.91	2.67
Phu Loc	10	TH Lăng Cô	3.73	2.27	3.80	3.51	3.53	2.80	1.87	3.01	4.07	3.07	2.00	2.87	3.40	4.40	1.53	3.59	1.73	1.20	3.07	1.78	2.95
Phu Loc	11	TH Lộc Sơn 1	3.20	2.60	3.93	3.12	4.67	4.87	1.73	4.24	3.87	1.67	1.93	2.86	3.07	3.47	1.00	2.92	1.60	1.80	3.27	2.50	3.13
Phu Loc	12	TH Lộc Sơn 2	2.73	1.67	3.87	2.57	4.00	4.27	3.27	3.97	4.00	4.20	1.00	3.03	2.93	3.27	1.27	2.82	1.73	2.33	3.13	2.63	3.00

			Physical condition				Human resource				Institutional issue				External relationship				Natural condition				SDRA
District	No	School names	P1	P2	P3	AVE	H1	H2	H3	AVE	I1	I2	I3	AVE	E1	E2	E3	AVE	N1	N2	N3	AVE	
Phu Loc	13	TH Lộc Tiến	3.47	3.13	4.07	3.61	4.27	3.87	3.33	3.98	3.93	3.60	3.00	3.61	2.60	3.67	2.40	3.10	3.13	1.80	2.80	2.41	3.34
Phu Loc	14	TH Lộc Trì 1	4.07	2.80	3.67	3.72	3.60	3.87	2.87	3.57	4.00	3.67	1.33	3.44	2.87	4.00	1.80	3.08	1.20	2.47	3.47	2.76	3.31
Phu Loc	15	TH Lộc Trì 2	3.47	2.40	3.93	3.44	4.07	4.13	1.67	3.28	4.00	3.53	3.20	3.66	3.27	3.87	1.27	2.70	1.73	2.20	2.53	2.08	3.03
Phu Loc	16	TH Nam Phổ Hạ	4.07	1.87	4.67	3.90	3.47	4.60	3.73	3.74	5.00	4.20	2.00	3.87	3.80	3.93	2.20	3.29	1.80	1.27	3.20	2.18	3.40
Phu Loc	17	Th Nước Ngọt 1	3.73	4.00	4.27	3.96	4.60	4.33	3.73	4.27	4.40	4.33	2.13	3.63	4.13	5.00	2.07	3.59	1.20	2.20	2.80	1.90	3.47
Phu Loc	18	TH Nước Ngọt 2	3.87	2.87	3.13	3.41	3.27	3.87	3.00	3.28	4.00	4.53	2.20	3.67	3.33	3.47	1.27	3.06	2.47	2.20	3.53	2.69	3.22
Phu Loc	19	TH Phú Thạch	1.80	2.13	4.27	2.68	4.13	4.13	2.87	3.71	3.67	2.00	1.53	2.68	3.20	4.13	1.53	2.80	1.13	1.00	1.80	1.33	2.64
Phu Loc	20	TH Sư Lỗ Đông	1.53	2.53	4.93	2.83	2.93	3.80	2.80	3.20	3.53	3.67	1.20	2.41	3.73	4.20	1.53	3.23	2.87	1.33	2.60	2.01	2.74
Phu Loc	21	TH Thị Trấn 1	3.40	3.33	4.33	3.70	4.73	4.87	3.73	4.42	4.00	4.40	3.47	3.89	4.80	5.00	3.60	4.43	1.67	1.00	2.53	1.84	3.66
Phu Loc	22	TH Thị Trấn 2	3.47	2.67	3.33	3.29	3.60	3.33	3.33	3.47	3.47	3.13	1.73	2.83	3.20	3.47	2.27	3.02	2.53	2.60	2.87	2.62	3.05
Phu Loc	23	TH Tiến Lực	4.47	2.47	4.33	4.09	4.47	4.60	4.20	4.40	5.00	3.73	2.73	4.03	4.33	3.73	1.53	3.30	1.40	2.27	2.60	1.94	3.55
Phu Loc	24	TH Trung Chánh	2.53	2.53	4.07	3.04	3.40	2.67	1.00	2.48	2.20	1.13	2.87	2.24	2.20	3.87	1.27	2.17	2.47	1.13	3.13	2.47	2.48
Phu Loc	25	TH Vinh Giang	2.93	1.93	3.47	2.87	2.87	2.00	2.47	2.51	4.73	3.00	1.67	2.91	2.80	4.00	2.07	3.28	1.40	1.80	3.60	2.63	2.84
Phu Loc	26	TH Vinh Hải	1.87	2.33	3.47	2.48	4.40	4.40	3.07	4.18	3.20	3.13	3.13	3.16	3.27	4.27	2.40	3.62	1.20	1.67	3.07	1.74	3.04
Phu Loc	27	TH Vinh Hưng 1	4.27	2.73	4.60	4.12	4.00	4.13	3.73	3.93	4.00	2.73	3.27	3.54	3.33	4.40	1.47	2.89	1.40	1.00	3.53	2.04	3.31
Phu Loc	28	TH Vinh Hưng 2	3.00	2.73	3.07	2.99	2.67	1.20	3.33	2.64	3.00	2.47	1.53	2.18	2.80	2.33	1.80	2.48	2.07	1.20	2.73	1.86	2.43
Phu Loc	29	TH Vinh Mỹ	3.87	2.00	4.07	3.28	2.93	2.20	2.00	2.53	3.13	2.00	1.67	2.02	2.60	3.27	1.67	2.78	2.13	2.07	3.87	2.68	2.66
Phu Loc	30	TH Xuân Lộc	3.00	3.00	3.40	3.07	4.13	3.80	3.53	3.87	4.20	3.27	2.00	3.37	3.80	4.80	2.33	3.81	2.67	1.47	3.53	2.21	3.26
Nam Dong	1	Hương Hoà	3.67	3.33	4.47	3.88	4.33	3.93	3.33	3.97	4.13	3.33	3.27	3.72	4.80	4.27	2.20	3.67	2.27	2.33	4.13	3.21	3.69
Nam Dong	2	Hương Hữu	4.87	5.00	5.00	4.98	4.27	4.53	4.80	4.49	4.00	3.33	3.00	3.61	3.93	3.87	2.40	3.39	2.00	2.20	3.27	2.67	3.83
Nam Dong	3	Hương Sơn	2.27	2.80	2.73	2.69	1.27	1.33	1.40	1.32	2.27	1.40	1.00	1.77	2.13	2.60	2.33	2.43	4.53	2.07	3.93	3.82	2.41
Nam Dong	4	Nam Phú	3.67	2.93	4.53	3.59	3.73	3.93	3.00	3.71	3.60	2.73	2.53	3.13	3.27	4.27	2.33	3.46	1.60	1.27	2.47	1.98	3.17
Nam Dong	5	Thị Trấn Khe Tre	2.93	3.07	4.27	3.44	2.73	2.93	3.27	2.92	3.27	2.73	2.60	2.98	3.27	4.60	1.67	3.40	2.93	2.60	3.53	3.18	3.18
Nam Dong	6	Thượng Long	4.33	2.60	4.60	3.56	4.33	4.20	4.00	4.21	3.20	4.00	4.00	3.60	4.27	3.20	2.93	3.29	1.20	1.00	2.60	1.87	3.30
A Luoi	1	TH A Đớt	3.13	3.27	3.73	3.40	4.00	3.67	3.73	3.86	3.07	3.07	0.00	2.04	2.53	3.87	1.80	2.51	3.47	3.13	3.13	3.30	3.02
A Luoi	2	TH A Ngo	3.27	1.40	3.00	2.87	3.07	2.87	2.20	2.74	3.67	2.40	1.87	2.86	2.53	3.13	1.80	2.39	3.80	3.47	3.40	3.49	2.87
A Luoi	3	TH A Roàng	4.07	2.87	4.80	4.11	6.00	5.07	2.80	4.78	5.67	1.07	0.53	3.19	0.47	7.00	0.60	3.78	2.67	2.67	1.20	2.42	3.66
A Luoi	4	TH Bắc Sơn	3.47	2.00	2.87	3.02	2.93	2.60	1.93	2.54	2.07	2.93	1.40	1.99	2.20	3.13	1.00	1.96	4.07	2.80	4.00	3.83	2.67
A Luoi	5	TH Đông Sơn	3.73	2.40	4.33	3.59	2.67	1.53	2.20	2.32	3.07	2.33	3.27	2.77	3.27	5.13	3.00	3.49	3.47	1.60	3.87	2.91	3.02
A Luoi	6	TH Hồng Bắc	2.80	1.93	2.73	2.50	3.47	3.67	2.27	3.10	3.93	3.40	2.73	3.27	2.47	3.67	1.87	2.57	3.13	1.67	2.07	2.47	2.78
A Luoi	7	TH Hồng Kim	2.13	2.00	4.00	2.73	4.07	4.00	3.60	3.90	3.60	2.20	2.20	2.90	1.27	3.73	1.27	1.68	4.13	3.00	3.93	3.88	3.02
A Luoi	8	TH Hồng Quảng	3.93	1.27	4.73	3.76	1.40	4.47	4.73	3.02	4.20	4.40	3.20	3.90	2.60	4.20	1.80	2.60	2.20	1.67	3.27	2.47	3.15
A Luoi	9	TH Hồng Thái	3.00	2.27	3.07	2.64	4.07	4.00	2.07	3.39	3.07	1.73	2.33	2.28	3.73	3.47	2.40	3.24	2.53	1.67	2.93	2.44	2.80
A Luoi	10	TH Hồng Thượng	2.93	2.47	3.27	2.81	2.93	3.13	2.20	2.63	3.73	2.20	1.40	2.83	1.80	1.80	1.80	1.80	3.47	3.07	3.13	3.17	2.65
A Luoi	11	TH Hồng Trung	3.00	2.27	3.07	2.64	4.07	4.00	2.07	3.39	2.93	1.73	2.33	2.23	3.73	3.47	2.40	3.24	2.53	1.67	2.93	2.44	2.79
A Luoi	12	TH Hồng Vân	2.07	1.27	3.87	2.53	4.13	3.87	4.13	4.00	4.40	3.53	2.60	3.66	4.40	3.80	2.20	3.73	1.53	2.67	4.07	3.18	3.42
A Luoi	13	TH HươngLâm	4.67	3.07	3.00	3.84	2.47	2.40	2.47	2.43	3.20	3.00	4.07	3.46	3.67	4.33	1.80	3.69	3.07	1.27	2.47	2.17	3.12
A Luoi	14	TH Nhâm	2.87	2.00	3.40	2.51	3.73	4.40	2.73	3.51	4.00	3.40	3.47	3.72	3.80	3.20	1.67	2.99	2.27	1.27	3.27	2.43	3.03
A Luoi	15	TH Phú Vinh	2.73	2.40	3.13	2.81	2.33	1.80	1.47	1.96	3.33	2.47	1.00	2.41	2.00	3.73	1.27	2.04	3.13	1.80	1.87	2.06	2.26
A Luoi	16	TH Sơn Thuỷ	2.47	2.00	3.93	2.88	2.40	3.33	2.80	2.69	3.73	3.47	1.00	2.78	1.07	2.87	1.27	1.43	4.00	2.87	4.07	3.66	2.69
A Luoi	17	TH Hồng Hạ	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
A Luoi	18	TH Hồng Thuỷ	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
A Luoi	19	TH Thị Trấn Số 1	2.80	3.00	4.07	3.50	4.00	4.33	3.87	4.09	4.53	3.80	2.27	3.79	3.53	3.80	2.13	3.43	3.53	3.20	2.93	3.17	3.60
A Luoi	20	TH Thị Trấn Số 2	3.40	1.93	4.20	3.42	2.60	2.33	2.87	2.64	3.40	4.00	1.80	2.97	1.40	3.73	2.80	2.26	4.53	3.00	3.53	3.10	2.88

Appendix 7- SDRA analysis in 36 primary schools of Hue City in 2013

	Physical condition				Human resource				Institutional issue				External relationship				Natural conditions				Overall CDRI
	P1	P2	P3		H1	H2	H3		I1	I2	I3		E1	E2	E3		N1	N2	N3		
An Cuu	4.40	3.60	3.47	3.98	4.20	4.73	3.67	4.29	4.00	2.87	2.60	3.39	4.40	4.07	3.47	4.08	4.27	2.60	3.87	3.79	3.90
An Hoa	3.47	2.20	3.80	3.21	3.73	3.07	2.87	3.33	3.80	2.60	3.07	3.36	3.80	3.20	1.80	3.17	1.80	2.20	3.20	2.17	3.05
Huong Long	4.13	3.13	3.47	3.63	2.73	2.13	2.27	2.36	3.33	3.00	2.00	2.83	3.27	3.60	2.07	3.23	2.47	1.40	3.27	2.07	2.82
Huong So	3.93	4.13	3.60	3.83	4.00	4.20	2.73	3.86	3.60	3.13	3.87	3.46	3.07	3.47	1.53	3.01	2.33	1.80	3.67	2.38	3.31
Le Loi	4.13	3.53	4.73	4.03	4.53	3.67	3.27	4.03	4.73	3.60	2.47	3.98	3.00	3.80	3.53	3.36	3.00	2.53	3.60	2.94	3.67
Le Quy Don	4.20	3.20	3.87	3.92	3.33	3.33	3.13	3.30	2.67	3.53	3.80	3.14	3.00	4.40	1.33	2.63	3.93	3.80	2.87	3.56	3.31
Ly Thuong Kiet	3.67	3.27	5.00	4.27	4.93	4.60	4.27	4.66	4.00	4.33	2.87	3.92	4.07	3.80	2.40	3.38	2.40	2.73	3.67	2.88	3.82
Ngo Kha	2.93	3.40	3.53	3.21	3.07	1.53	2.73	2.70	3.67	2.93	1.80	2.92	3.07	3.73	2.07	3.23	2.27	2.00	2.53	2.22	2.86
Ngu Binh	4.07	4.53	4.07	4.14	4.27	4.40	4.00	4.29	4.00	3.47	4.00	3.82	4.53	4.00	4.00	4.09	3.00	3.80	2.93	3.11	3.89
Nguyen Trai	2.20	2.67	4.27	2.70	3.87	3.00	2.87	3.39	3.00	1.80	1.93	2.42	2.00	3.47	2.33	2.79	2.00	2.60	4.47	2.92	2.84
Phu Binh	2.93	2.47	5.40	4.01	3.40	4.47	2.73	3.64	4.07	3.33	2.93	3.63	3.27	3.80	2.80	3.46	2.73	2.47	2.93	2.79	3.51
Phu Cat	1.60	3.00	3.47	2.46	3.80	2.87	2.53	3.22	3.33	1.87	2.87	2.77	2.73	3.87	2.40	3.19	1.67	1.40	3.33	1.86	2.70
Phu Hau	3.67	2.80	4.40	3.77	4.60	4.53	3.27	4.36	3.80	2.73	2.33	3.20	2.27	4.33	1.27	2.97	1.67	2.07	2.87	2.00	3.26
Phu Hoa	4.73	4.20	4.60	4.60	4.73	4.93	4.27	4.72	5.00	4.00	3.13	3.73	4.87	4.80	2.47	4.43	3.93	3.80	4.73	4.02	4.30
Phu Luu	4.33	3.40	4.07	4.09	4.13	4.40	3.47	4.16	4.00	3.27	2.53	3.51	3.80	4.33	1.93	3.76	2.00	1.20	2.67	1.84	3.47
Phu Thuan	3.47	2.73	4.47	3.68	3.60	2.60	3.60	3.10	3.60	3.40	1.93	2.73	3.07	3.67	2.33	2.90	1.00	1.00	3.47	1.41	2.76
Phước Vinh	4.00	3.20	4.53	4.13	4.13	4.27	2.67	3.67	3.53	3.67	5.00	3.84	4.33	4.40	2.80	4.11	1.93	1.80	3.60	2.17	3.58
Phuong Duc	4.20	3.80	4.53	4.24	3.60	4.00	3.67	3.74	3.67	3.40	2.87	3.40	3.47	4.47	3.40	4.92	2.47	3.40	3.00	2.87	3.84
So 1 An Dong	3.60	3.67	4.07	3.84	2.67	3.33	2.67	2.78	4.00	2.87	1.60	2.61	3.73	4.07	1.80	3.52	3.40	2.00	3.60	2.97	3.14
So 1 Kim Long	5.00	5.00	4.47	4.91	4.93	4.93	3.80	4.74	4.47	3.93	1.87	3.86	3.13	3.73	3.47	3.49	4.27	3.53	4.07	4.08	4.22
So 2 An Dong	2.73	3.93	4.00	3.76	2.47	2.20	2.60	2.40	1.93	1.67	2.93	2.22	2.53	3.40	1.27	2.61	1.40	1.53	2.60	1.64	2.53
So 2 Kim Long	4.87	4.67	3.47	4.13	3.67	4.73	3.53	4.18	4.33	2.47	1.87	3.30	2.67	3.40	2.00	2.81	1.20	1.80	4.60	2.07	3.30
Tay Loc	4.00	4.47	4.87	4.30	4.80	5.00	4.47	4.84	4.67	4.27	3.67	4.30	4.53	4.73	2.20	4.24	2.40	1.80	3.67	2.72	4.08
Thanh Long	3.27	2.53	3.67	3.34	3.80	2.87	2.60	3.24	4.00	3.07	3.27	3.32	3.87	3.87	3.00	3.43	3.00	2.07	3.00	2.84	3.24
Thuan Hoa	3.60	4.00	4.53	4.13	2.47	2.47	2.20	2.38	4.00	2.87	1.67	2.46	3.93	3.07	2.93	3.17	2.60	2.00	3.20	2.70	2.97
Thuan Loc	3.40	4.40	4.40	3.90	4.20	4.07	3.73	4.06	4.80	3.00	1.00	2.63	3.80	2.53	2.07	2.59	2.07	2.87	2.20	2.36	3.11
Thuan Thanh	4.20	4.60	4.73	4.44	2.47	3.73	3.07	3.20	4.00	3.27	2.33	3.48	2.53	3.07	1.20	2.36	1.60	1.80	4.87	2.72	3.24
Thuy Bieu	4.00	1.93	2.73	2.68	4.40	3.93	2.67	3.96	3.67	3.20	2.13	3.26	3.20	4.20	1.40	3.10	2.00	1.80	3.27	2.14	3.03
Thuy Xuan	3.47	2.27	4.07	3.37	4.47	4.40	4.40	4.41	3.67	3.73	2.07	3.43	2.80	2.80	2.20	2.60	2.20	3.60	3.67	2.91	3.34
Tran Quoc Toan	3.40	3.07	3.80	3.36	3.27	2.33	2.33	2.64	3.27	3.00	2.93	3.08	2.87	3.47	2.07	2.90	2.07	1.27	3.13	1.98	2.79
Trieu Son Tay	4.60	5.00	4.60	4.80	4.67	4.20	4.60	4.50	4.67	3.60	4.20	4.23	3.87	4.27	3.20	3.89	4.40	1.53	3.27	3.26	4.14
Truong An	3.73	3.53	4.20	3.74	4.47	4.87	2.00	4.26	3.40	3.47	2.33	3.24	1.87	3.07	1.87	2.27	2.47	3.40	3.53	2.96	3.29
Vinh Loi	4.40	3.20	4.60	3.83	3.13	2.40	3.53	2.90	4.00	3.33	2.20	3.48	2.53	2.93	1.73	2.60	1.87	2.53	3.27	2.32	3.03
Vinh Ninh	4.53	3.53	4.00	3.93	2.47	3.67	3.40	2.98	4.00	2.73	3.07	3.48	3.60	3.87	1.27	3.34	2.73	2.33	4.33	2.87	3.32
Vy Da	4.20	4.07	4.27	4.20	4.60	4.07	4.33	4.42	3.47	4.13	3.93	3.73	4.33	4.00	3.47	4.02	3.60	2.33	3.87	3.01	3.88
Xuan Phu	4.67	3.20	3.87	4.16	3.47	3.60	3.20	3.49	4.00	3.60	4.47	3.94	2.80	2.60	1.60	2.30	3.27	2.40	3.93	3.34	3.45
	3.83	**3.51**	**4.16**	**3.85**	**3.81**	**3.71**	**3.25**	**3.67**	**3.84**	**3.20**	**2.76**	**3.34**	**3.35**	**3.73**	**2.30**	**3.28**	**2.54**	**2.31**	**3.46**	**2.66**	**3.36**

Appendix 8- SDRA analysis in Da Nang City by districts

		Physical condition				Human resource				Institutional issue				External relationship				Natural condition				Overall
		1.1	1.2	1.3		2.1	2.2		2.3		3.1	3.2	3.3		4.1	4.2	4.3		5.1	5.2	5.3	
1	**Hai Chau**	3.75	4.58	3.64	4.19	4.18	2.94	3.12	3.86	3.69	3.12	1.91	2.97	3.07	3.78	1.87	2.92	2.62	2.62	3.76	2.71	3.22
2	**Son Tra**	3.00	4.28	3.38	4.16	3.83	2.96	3.20	3.79	3.91	3.10	2.47	3.13	3.32	3.70	1.73	3.09	2.23	2.41	3.11	2.44	3.17
3	**Lien Chieu**	3.47	3.93	3.77	3.23	3.40	3.09	3.77	3.20	3.87	3.14	2.61	3.11	2.93	4.30	1.67	3.13	2.76	2.53	3.49	2.66	3.17
4	**Thank khe**	3.42	4.14	3.78	4.30	3.72	3.17	3.83	3.85	3.69	3.29	2.22	3.18	3.10	3.34	1.57	2.80	2.92	2.68	3.86	3.17	3.36
5	**Ngu Hanh Son**	3.23	4.19	3.49	3.24	3.08	2.93	3.09	3.16	3.78	2.77	1.70	2.78	3.25	3.81	1.58	3.18	2.28	2.36	3.48	2.51	3.02
6	**Cam Le**	3.34	4.47	3.55	4.01	3.91	2.83	3.04	3.74	4.14	3.12	2.22	3.45	3.40	4.27	1.60	3.29	2.92	2.12	3.56	2.77	3.36
7	**Hoa Vang**	3.68	4.33	3.79	3.76	3.79	3.19	3.44	3.64	3.97	3.18	2.84	3.45	3.27	4.07	2.02	3.32	1.97	1.80	3.12	2.12	3.27

Appendix 9- SDRA of 76 primary schools in Da Nang City

			Physical condition				Human resource				Institutional issue				External relationship				Natural condition				SDRA
District	No	School names	P1	P2	P3	AVE	H1	H2	H3	AVE	I1	I2	I3	AVE	E1	E2	E3	AVE	N1	N2	N3	AVE	
Hai Chau	1	Bạch Đằng	3.60	4.33	4.47	4.16	5.00	4.93	4.00	4.48	4.00	3.60	1.00	2.37	3.87	4.27	2.33	3.23	3.13	2.33	3.67	2.96	**3.44**
Hai Chau	2	Hoàng Văn Thụ	3.80	3.20	4.87	3.78	4.53	4.40	3.53	4.32	4.00	3.33	1.00	3.28	3.40	3.80	2.07	3.38	3.80	2.93	3.80	3.51	**3.65**
Hai Chau	3	Hùng Vương	1.73	2.93	4.60	2.61	3.27	3.27	2.53	3.14	2.60	2.40	1.73	2.39	2.20	3.40	1.27	2.64	2.73	3.00	4.47	3.16	**2.79**
Hai Chau	4	Lê Đình Chinh	2.87	4.27	4.00	3.67	4.67	4.33	2.80	3.62	3.93	3.27	2.60	3.49	2.40	3.80	2.33	2.83	3.40	3.20	3.13	2.16	**3.15**
Hai Chau	5	Lê Lai	2.47	3.53	4.27	3.54	4.07	4.40	2.40	3.90	3.87	2.60	2.33	2.98	3.00	3.93	1.53	3.22	1.53	1.47	3.53	1.83	**3.10**
Hai Chau	6	Lê Quý Đôn	4.07	4.33	4.47	4.31	5.00	4.93	4.00	4.48	4.00	3.60	1.00	2.37	3.87	3.93	2.33	3.12	3.13	2.33	3.67	2.96	**3.45**
Hai Chau	7	Lý Công Uẩn	3.33	4.67	4.87	4.03	4.00	4.27	2.00	3.76	4.33	3.00	2.00	3.28	3.40	4.07	1.60	2.72	3.47	3.00	4.47	3.48	**3.45**
Hai Chau	8	Nguyễn Du	4.40	4.80	4.60	4.57	4.67	3.60	2.47	3.94	4.00	3.07	1.80	3.17	3.33	3.67	2.33	3.33	3.47	3.93	3.27	3.59	**3.72**
Hai Chau	9	Ông Ích Khiêm	3.13	4.27	4.93	3.81	4.33	4.60	4.33	4.42	4.00	3.93	4.13	4.03	3.73	4.33	1.20	2.99	1.27	2.93	4.20	2.31	**3.51**
Hai Chau	10	Phù Đổng	2.47	2.13	4.60	2.71	3.27	3.27	1.80	3.02	2.60	2.40	1.67	2.38	2.20	3.27	1.27	2.09	1.40	2.33	4.33	2.20	**2.48**
Hai Chau	11	Võ Thị Sáu	2.40	2.73	4.67	2.89	3.33	4.00	2.47	3.41	3.27	3.13	1.73	2.97	2.33	3.13	2.33	2.60	1.47	1.40	2.87	1.68	**2.71**
Son Tra	1	Chi Lăng	2.87	3.00	4.20	3.13	3.87	3.60	3.33	3.64	4.40	2.87	1.93	3.22	2.87	3.93	2.47	3.33	1.80	2.33	2.67	2.21	**3.11**
Son Tra	2	Đinh Tiên Hoàng	3.60	2.67	3.87	3.33	4.60	4.53	3.33	3.61	4.00	3.47	4.33	3.88	3.00	4.27	1.27	3.13	3.80	3.33	1.67	3.29	**3.45**
Son Tra	3	Hai Bà Trưng	3.67	2.20	4.33	3.64	3.87	4.80	3.40	4.10	4.33	3.13	2.13	3.57	3.80	3.47	1.27	3.42	2.73	1.53	3.13	2.20	**3.39**
Son Tra	4	Lương Thế Vinh	3.00	2.93	4.67	3.26	4.80	4.40	3.40	4.43	4.00	3.87	1.00	2.98	3.20	3.80	1.27	3.08	1.00	3.40	2.47	2.04	**3.16**
Son Tra	5	Ngô Gia Tự	2.27	2.07	3.87	2.43	4.40	4.07	3.47	4.13	4.40	3.73	2.60	3.39	4.00	3.47	1.80	3.46	1.00	2.07	2.87	1.67	**3.02**
Son Tra	6	Ngô May	3.67	3.47	4.73	3.78	4.47	3.87	2.87	4.00	3.93	2.67	3.87	3.69	2.93	3.73	1.40	2.82	1.67	2.80	4.20	2.47	**3.35**
Son Tra	7	Nguyễn Phan Vinh	2.67	3.40	4.00	3.23	4.73	4.20	2.00	4.10	3.53	3.27	2.80	3.16	3.60	3.20	2.53	3.22	2.33	2.27	2.67	2.36	**3.21**
Son Tra	8	Nguyễn Thái Học	3.73	2.80	4.47	3.54	3.13	3.67	2.47	3.20	3.67	2.53	3.20	3.06	2.60	3.53	1.27	2.26	4.27	3.13	3.60	3.78	**3.17**
Son Tra	9	Nguyễn Tri Phương	3.20	3.67	3.40	3.39	3.80	3.13	1.40	3.18	3.00	1.53	1.67	1.84	2.87	2.73	1.00	2.51	2.67	3.53	3.27	3.20	**2.82**
Son Tra	10	Nguyễn Văn Thoại	2.53	2.47	4.13	3.06	4.40	3.33	2.93	3.73	3.80	3.13	2.20	3.31	3.07	4.20	3.20	3.66	2.53	3.07	3.27	2.92	**3.34**
Son Tra	11	Quang Trung	4.33	3.93	4.60	4.24	4.00	4.47	3.80	4.12	3.73	3.40	2.60	3.06	4.07	3.20	2.00	3.29	2.07	1.60	4.33	2.21	**3.38**
Son Tra	12	Tiểu La	3.27	4.00	4.00	3.63	4.20	3.73	2.33	3.73	4.00	3.67	2.00	2.89	3.80	3.40	1.80	2.67	2.27	1.20	3.53	2.12	**3.01**
Son Tra	13	Tô Vĩnh Diện	3.00	2.53	4.73	3.13	3.07	2.47	2.87	2.83	4.00	2.27	3.27	3.34	2.93	4.27	1.80	2.78	1.00	1.27	3.00	1.42	**2.70**
Son Tra	14	Trần Quốc Toản	2.93	2.87	4.87	3.57	4.93	3.33	3.87	4.22	4.00	3.87	1.00	2.46	3.80	4.67	1.13	3.64	2.13	2.20	2.87	2.28	**3.23**
Lien Chieu	1	Âu Cơ	3.93	2.67	3.53	3.52	3.87	3.00	2.60	3.22	4.33	3.27	2.93	3.74	3.00	4.40	1.53	3.46	3.93	3.93	3.47	3.86	**3.56**
Lien Chieu	2	Bui Thi Xuan	4.73	3.60	4.27	4.39	3.13	3.53	3.47	3.31	4.53	3.40	2.33	3.06	3.07	4.73	2.07	3.46	3.93	3.47	4.07	3.72	**3.59**
Lien Chieu	3	Hải Vân	4.33	3.60	4.40	4.24	3.13	3.53	3.47	3.31	4.53	3.40	2.33	3.06	1.87	4.73	1.80	2.81	1.00	1.00	3.67	1.44	**2.97**
Lien Chieu	4	Hồng Quang	4.00	3.87	4.47	4.19	4.20	4.73	4.07	4.44	3.33	2.73	1.27	2.69	3.27	4.07	1.00	2.40	3.93	3.67	4.27	3.90	**3.52**
Lien Chieu	5	Ngô Sỹ Liên	2.80	3.40	3.20	3.07	2.67	1.73	1.33	1.69	2.27	3.13	1.53	2.43	2.13	4.07	2.33	3.20	4.07	2.80	3.33	2.26	**2.53**
Lien Chieu	6	Nguyễn Văn Trỗi	4.27	3.60	4.13	4.11	2.13	2.93	2.67	2.44	4.33	2.60	1.27	2.22	2.27	4.40	1.80	2.90	2.93	2.67	3.07	2.87	**2.91**
Lien Chieu	7	Phan Phu Tiên	3.40	3.87	3.47	3.50	3.60	3.73	3.67	3.68	4.33	3.87	3.93	3.97	3.33	4.20	2.20	3.06	3.07	3.20	3.40	3.17	**3.47**
Lien Chieu	8	Trần Bình Trọng	3.00	3.20	4.27	3.46	2.67	3.27	2.73	2.88	2.87	2.13	3.33	2.70	3.00	4.07	1.27	3.24	1.00	1.00	2.53	1.26	**2.71**
Lien Chieu	9	Triệu Thị Trinh	3.47	3.40	3.60	3.47	3.67	4.13	3.80	3.84	4.27	3.73	4.60	4.14	4.47	4.00	1.07	3.67	1.00	1.00	3.60	1.43	**3.31**
Thank khe	1	Đinh Bộ Lĩnh	3.67	4.07	4.53	4.02	4.60	3.73	2.93	4.03	4.13	2.60	2.13	3.29	3.87	4.07	1.53	3.19	3.13	3.20	2.93	3.12	**3.53**
Thank khe	2	Dũng Sĩ Thanh Khê	4.67	3.93	4.27	4.17	4.40	4.00	2.93	4.02	1.53	3.27	3.40	2.71	3.87	3.87	1.67	2.77	1.87	3.40	3.67	2.68	**3.27**
Thank khe	3	Hoa Lư	3.53	2.80	3.87	3.52	3.27	3.13	3.27	3.24	3.47	2.73	2.93	3.13	2.33	3.40	1.60	2.57	1.93	1.93	4.33	2.33	**2.96**
Thank khe	4	Lê Quang Sung	3.47	3.47	4.80	3.91	4.00	2.40	2.67	3.24	3.60	2.07	2.47	2.90	3.53	2.60	1.27	2.84	3.47	4.33	4.07	4.06	**3.39**
Thank khe	5	Lê Văn Tám	3.20	3.20	4.33	3.39	4.73	3.93	2.47	3.58	4.33	4.27	1.00	2.66	1.00	1.67	2.07	1.64	4.00	1.00	3.73	2.46	**2.74**
Thank khe	6	Nguyễn Bỉnh Khiêm	4.27	3.80	4.80	4.46	4.73	4.73	4.07	4.62	4.73	4.40	2.07	4.18	3.80	3.73	1.27	3.34	2.27	1.67	4.07	3.72	**4.06**
Thank khe	7	Nguyễn Trung Trực	4.00	2.67	2.40	2.98	4.40	4.13	3.87	4.18	4.00	3.67	1.53	3.42	3.27	4.07	1.60	3.26	3.80	3.20	4.20	3.80	**3.53**
Ngu Hanh Son	1	Lê Bá Trinh	3.73	3.13	4.13	3.73	2.80	2.87	3.07	2.87	3.60	1.67	1.93	2.68	3.33	3.87	2.07	3.30	3.33	3.20	3.80	3.37	**3.19**
Ngu Hanh Son	2	Lê Lai	3.07	2.07	3.20	2.76	1.93	1.93	2.60	2.04	3.33	1.67	1.00	2.28	2.07	3.27	1.27	2.33	3.33	2.33	3.53	3.03	**2.49**
Ngu Hanh Son	3	Lê Văn Hiến	3.53	3.47	3.87	3.57	3.73	4.47	2.40	3.76	3.53	3.13	1.47	3.06	2.80	3.60	1.27	2.81	1.53	2.13	3.33	2.03	**3.04**
Ngu Hanh Son	4	Mai Đăng Chơn	3.53	4.27	4.87	4.00	3.07	2.80	2.80	2.93	4.00	3.40	1.00	2.40	2.80	4.13	1.27	3.20	1.20	2.60	4.00	2.13	**2.93**
Ngu Hanh Son	5	Nguyễn Duy Trinh	1.80	4.27	4.40	3.06	4.73	4.73	3.27	4.49	4.53	3.53	1.87	3.48	4.07	4.13	1.53	3.68	1.00	1.60	2.87	1.51	**3.24**
Ngu Hanh Son	6	Phạm Hồng Thái	3.00	2.80	4.27	3.60	4.20	3.67	3.87	3.97	4.67	3.67	1.33	2.67	4.93	4.60	1.33	4.22	1.27	1.27	3.80	1.69	**3.23**

Ngu Hanh Son	7	Tô Hiến Thành	3.53	2.80	4.53	3.74	2.40	2.13	2.40	2.36	3.00	2.53	2.27	2.56	2.73	2.93	1.27	2.56	4.07	3.13	3.33	3.63	**2.97**
Ngu Hanh Son	8	Trần Quang Diệu	2.53	3.00	4.27	3.48	3.07	2.00	3.00	2.87	3.53	2.53	2.73	3.10	3.27	3.93	2.60	3.38	2.53	2.60	3.13	2.66	**3.10**
Cam Le	1	Diên Hồng	3.07	2.00	3.53	2.79	3.13	2.00	1.13	2.42	3.40	1.93	2.80	2.96	2.27	4.13	1.13	2.32	4.20	2.93	3.53	3.66	**2.83**
Cam Le	2	Hoàng Dư Khương	3.27	3.27	4.93	3.82	4.33	4.73	3.80	4.38	4.73	4.67	1.73	4.21	4.47	3.87	1.80	3.48	1.93	3.00	3.80	2.78	**3.73**
Cam Le	3	Ngô Quyền	4.93	4.13	4.40	4.62	3.67	4.60	4.00	4.03	4.80	1.93	1.00	3.21	2.93	4.00	1.27	2.91	5.00	1.53	4.73	3.80	**3.72**
Cam Le	4	Nguyễn Như Hạnh	2.93	3.67	4.73	3.66	4.33	3.73	3.67	4.02	4.93	4.20	1.00	4.03	3.80	4.80	1.80	3.30	4.53	3.33	3.87	3.82	**3.77**
Cam Le	5	Ông Ích Đường	2.73	3.47	4.87	3.57	3.33	3.20	3.27	3.26	3.93	3.00	4.07	3.64	3.87	4.33	1.27	3.67	2.93	2.13	3.13	2.87	**3.40**
Cam Le	6	Thái Thị Bôi	2.87	4.20	4.87	4.09	4.33	4.60	3.33	4.26	4.00	3.53	1.87	3.41	3.40	4.40	1.53	3.42	1.73	1.87	3.73	2.11	**3.46**
Cam Le	7	Trần Đại Nghĩa	2.47	2.93	4.27	3.14	4.40	3.67	1.40	3.66	4.00	3.27	1.00	2.88	4.33	4.47	1.60	3.94	2.47	1.60	2.47	2.18	**3.16**
Cam Le	8	Trần Nhân Tông	2.47	3.13	4.33	3.00	4.60	4.73	2.73	4.00	3.47	3.07	4.20	3.51	2.67	4.73	2.40	3.61	1.93	1.67	3.67	2.13	**3.25**
Cam Le	9	Trần Văn Dư	2.67	3.27	4.27	3.30	3.93	3.93	2.13	3.63	4.00	2.47	2.33	3.21	2.87	3.67	1.60	2.92	1.53	1.00	3.13	1.62	**2.94**
Hoa Vang	1	Hòa Bắc	2.93	3.13	4.20	3.39	3.07	3.60	3.47	3.31	4.33	2.80	3.33	3.23	3.53	3.47	2.20	3.28	1.87	1.93	2.67	2.03	**3.05**
Hoa Vang	2	Hòa Khương 1	3.20	3.00	4.40	3.57	4.13	4.00	2.47	3.56	3.87	4.13	4.40	4.04	3.20	4.67	2.00	3.73	3.40	1.53	3.53	2.51	**3.48**
Hoa Vang	3	Hòa Khương 2	3.93	4.53	4.73	4.30	4.73	4.73	3.33	4.50	4.47	3.73	4.60	4.39	3.60	4.20	2.47	3.71	1.87	2.33	4.13	2.48	**3.88**
Hoa Vang	4	Hòa Liên	3.27	3.40	4.53	3.71	4.00	3.73	3.40	3.81	3.73	2.67	4.13	3.44	2.73	3.27	1.60	2.81	2.07	2.07	3.27	2.27	**3.21**
Hoa Vang	5	Hòa Ninh	4.07	3.60	4.47	3.97	2.33	2.60	3.07	2.54	4.20	2.40	1.33	3.12	4.00	4.73	1.40	3.93	1.67	2.40	3.13	2.28	**3.17**
Hoa Vang	6	Hòa Phú	3.47	3.67	4.73	3.92	4.60	4.73	4.13	4.57	5.00	4.00	2.00	4.17	3.13	4.53	2.40	3.71	2.07	1.40	2.53	1.92	**3.66**
Hoa Vang	7	Hòa Phước	2.47	4.33	3.13	3.51	4.40	4.27	4.00	4.18	4.40	2.67	2.67	2.96	2.93	4.13	2.00	3.18	1.93	2.80	3.80	2.70	**3.30**
Hoa Vang	8	Lâm Quang Thự	3.67	3.80	4.13	3.81	3.67	4.53	4.07	3.94	4.40	4.00	1.20	3.27	4.73	4.73	2.60	4.02	2.27	1.40	2.73	1.91	**3.39**
Hoa Vang	9	Số 1 Hòa Châu	4.33	4.60	4.27	4.46	2.87	3.00	2.60	2.87	4.27	3.67	2.73	3.66	2.93	4.20	2.80	3.33	1.40	1.13	4.20	1.73	**3.21**
Hoa Vang	10	Số 1 Hòa Nhơn	4.13	3.27	4.67	4.17	4.33	4.73	3.80	4.38	4.00	4.33	3.67	4.11	4.27	4.53	2.33	4.03	1.60	1.27	2.60	1.66	**3.67**
Hoa Vang	11	Số 1 Hòa Tiến	3.33	3.80	3.93	3.71	2.53	2.53	3.27	2.66	2.87	2.53	3.13	2.90	3.33	4.00	2.33	3.39	1.40	1.93	3.13	1.96	**2.92**
Hoa Vang	12	Số 2 Hòa Châu	2.20	3.07	4.40	2.86	4.27	3.47	3.40	3.72	3.93	2.47	1.67	3.07	1.67	3.40	1.67	2.24	2.00	1.87	2.00	1.96	**2.77**
Hoa Vang	13	Số 2 Hòa Liên	3.40	3.53	4.07	3.64	3.73	4.40	2.47	3.74	3.73	1.87	2.60	3.04	3.20	3.87	1.27	2.67	2.67	1.93	2.87	2.33	**3.09**
Hoa Vang	14	Số 2 Hòa Nhơn	3.80	3.40	4.53	3.79	4.33	4.40	3.80	4.27	4.00	4.27	3.47	4.04	4.07	4.47	1.27	3.20	1.60	1.27	2.47	1.63	**3.39**
Hoa Vang	15	Số 2 Hòa Phước	3.00	3.93	4.40	3.70	3.53	3.47	1.20	3.12	2.73	1.33	1.20	1.99	1.60	3.87	2.07	2.81	2.20	2.20	3.20	2.37	**2.80**
Hoa Vang	16	Số 2 Hòa Tiến	4.00	3.40	4.80	4.30	4.27	4.67	3.67	4.30	4.13	3.87	1.87	3.67	3.60	4.00	1.27	3.41	1.87	1.93	3.27	2.59	**3.65**
Hoa Vang	17	Số 2 Hòa Sơn	3.27	4.07	4.13	3.68	3.20	1.60	2.07	2.48	3.47	3.40	4.33	3.59	3.00	3.07	2.67	2.97	1.60	1.27	3.47	1.80	**2.90**

Appendix 10– Questionnaire on Disaster Risk Reduction Education for Teacher

Questionnaire Survey on Disaster Risk Reduction Education (For Teacher)

Department of Science and Technology, Ministry of Education and Training, Viet Nam
Graduate School of Global Environmental Studies (GSGES), Kyoto University, Japan

This questionnaire aims to understand the current situation on integration of disaster risk reduction into the education sector at school level. Findings from this study are expected to contribute in promotion of disaster risk reduction education in Viet Nam. This questionnaire is simple and takes you about **10 minutes**. There is **no wrong answer**, only your answers will be recorded. All the information obtained from this questionnaire will be strictly used for academic research purpose and kept confidential.
Thank you very much for your kind cooperation.

A. Contact details of Respondent

Name:_____
Age: ☐< 20 ☐21-40 ☐41-60 ☐> 60 Sex: ☐Male ☐Female
School name: _____
Experience:
_____
years
Subjects: _____ Grade _____
_____ Grade _____
Date: _____

B. Please answer the following question on your experiences in disaster education

<table>
<tr><td colspan="4">1. What is natural disaster?</td></tr>
<tr><td colspan="4">□ Natural disaster is a circumstance which causes huge damage to life and property, which exceed the capacity of affected communities.
□ Natural disaster is natural hazards such as typhoon, flood, and earthquake including the one which lead to only a small damage.
□ Natural disaster is a circumstance which is caused by the anger of the God.</td></tr>
<tr><td colspan="4">2. Do you think education for disaster risk reduction is important?</td></tr>
<tr><td colspan="4">□ YES □NO</td></tr>
<tr><td colspan="4">3. Do you teach about disasters related issues?</td></tr>
<tr><td>□ YES</td><td>□ curriculum (go to 3.1&3.2 & 3.5)
□ extra-curriculum (go to 3.3 & 3.4 & 3.5)
□ both (go through 3.1 to 3.5)</td><td>□ NO</td><td>□Limited teaching materials
□Limited knowledge
□Limited time
□Limited budget for preparation
□Other (specify:</td></tr>
<tr><td colspan="4">3.1 What type of disasters do you teach?</td></tr>
<tr><td colspan="4">□Floods □Droughts □Landslide
□Typhoons □Saline intrusion □Other (……)</td></tr>
<tr><td colspan="4">3.2 Are these following issues covered in your lessons about disaster education?</td></tr>
<tr><td colspan="4">□Cause and nature of disasters □Vulnerability □Preparedness</td></tr>
</table>

□Effects of disasters & relief	□Disaster risk	□Response, rescue
□Lesson from past disasters	□ Disaster risk reduction	□Recovery

3.3 What kind of activities do you use to teach about disaster related issues as extra-curriculum?		
□Evacuation mock drill	□First aid and task force	□Non-structural mitigation
□Town watching	□Hazard mapping	□Essay contest
□Drawing competition	□Paper craft making	□Newspaper/ newsletter
□Story show	□Cooking competition	□Disaster related game
□Emergency bag making	□Reporter	□Others (specify

3.4 What kind of extra-curriculum do you conduct?		
□Social activities	□Competitions	□Performance
□Field trip	□Camping	□School festivals
□Clubs	□Environmental campaign	□ Others (specify:

3.5 How often do you provide disaster education?			
□Once a week	□Once a month	□Once a school term	□Once a year
□Only in the beginning of disaster season		□Others (specify	

4. Have you participated in a disaster related training?			
□ YES	held by □MoET □DoET □BoET □School □NGOs □Others (specify:	□ NO	□Limited teaching materials □Limited knowledge □Limited time □Limited budget for preparation □Other (specify:

C. Please tell us your needs on disaster education

5. Do you want to conduct disaster education in your school?			
□ YES	□ curriculum □ extra-curriculum □ both	□ NO	□Limited teaching materials □Limited knowledge □Limited time □Limited budget for preparation □Other (specify:

6. What type of information do you need to be able to conduct disaster education?		
□Cause and nature of disasters	□Disaster risk reduction	□Way to create materials
□Effects of disasters	□Preparedness	□Way to conduct DE as extra-curriculum
□Lesson from past disasters	□Response, rescue & relief	□Way to integrate DE into subjects
□First aid and task force	□Recovery	□Others(specify

7. Which contents and in which subjects/grade do you want to teach?

Contents	**Subjects**				
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
□Cause and nature of disasters					
□Effects of disasters					
□Lesson from past disasters					
□First aid and task force					
□Evacuation mock drill					
□Town watching/Hazard mapping					
□Emergency bag making					
□ Newspaper/ newsletter					
□Disaster reporter/story show					

□Disaster related competition (drawing, essay,..)					
□Disaster related game					
□Others (specify					
□Others (specify					
□Others (specify					

8. By what way do you want to receive the disaster related information?
□ Materials □Workshop □ Training □Others(specify
9. How often can you provide disaster education?
□Once a week □Once a month □Once a school term □Once a year □Only in the beginning of disaster season □Others (specify
10. Do you have intention to share what you learn about disaster related issues for other teachers/students?
□ YES □NO

Thank you very much for your cooperation!

Appendix 11 Examples on the integration of DRR into the curriculum, cross-curricular subjects and extra-curricular activities at primary level

Subjects				Curriculum	Life skills education program	Local education program	Extra-curriculum
Vietnamese	Grade 1	60	"ieu"	Indigenous knowledge on rainy and sunny season	Listen to indigenous DRR legend/ superstition born in indigenous place		Newspaper Essay contest
		85	"uon"	Indigenous knowledge on rainy and sunny season			Newspaper Essay contest
		92	"oay"	Cyclone			Newspaper Essay contest
	Grade 2	20	Four seasons – Mr Manh fights with the God of the wind	Story about typhoon and how local people protect their house and response to typhoon	Managing stresses and feeling including fear of disasters, worry about damages on disasters		Newspaper Essay contest
			Four seasons – The flood season	People living with flood in Southern areas			Newspaper Essay contest
	Grade 3	4	Family	Impacts of typhoon	Study of self-management skills on DRR		Newspaper Essay contest
		7	Community	The relationship between people in local community in the normal and in time of disaster	Learning how to communicate with others in time of emergency		Newspaper Essay contest
	Grade 4	27	Heroes	Saving people's life during the flood occurred	Generate new ideas about how to mitigate/prevent or reduce the impacts of disaster. Orient creative thinking to actions adapting to changing circumstance		Newspaper Essay contest
	Grade 5	9	Human and nature	Flood in the Southern areas			Newspaper Essay contest
		11	Save the green	Typhoon and its impact to human life			Newspaper Essay contest
				Prevention measure to typhoon			Newspaper Essay contest
		13	Save the green (cont.)	Tell a story about a heroes that save life during a disaster			Newspaper Essay contest
Nature and Society	Grade 1	20	Safety on the way to school	The risk that students could face on the way from home to school in the normal and flooding time			
		33	Hot days and cold days	Description of the weather events such as hot wave and extreme cold weather			Newspaper
	Grade 2	13	Keep the house and surrounding environment clean	Protect environment around house and living places			Town watching
		18	Keep school clean and beautiful	Keep school clean and beautiful			Hazard mapping
	Grade 3	36	Keep sanitation in school and house	Keep sanitation in school and house			Town watching
		50	The sun	The sun			Newspaper

		65	The climatic zones	The climatic zones			Newspaper
Science	Grade 4	17	Prevent drowning accidents	What to do and do not to prevent drowning accidents during the flood season	Learning the basic process in critical thinking and make objective judgments about choices and risks		First aid and tasks
		28	Water resource protection	The importance of water resource and the way to protect water resource			
		29	Water saving	The role of water for daily life and during emergency situation	Generate new ideas about how to mitigate/prevent or reduce the impacts of disaster. Orient creative thinking to actions adapting to changing circumstance		
		38	Light winds, strong winds; typhoon prevention and response	Mechanism, cause and impacts of typhoon	Study on step of how to do decision-making about important plan or actions to response to disaster		Story show Emergency bag
				Prevention, mitigation, preparedness and response to typhoon			
		39	Air pollution	The impacts of air pollution to human health			
		40	Air protection	The importance to protect the atmosphere			
		54	The role of heat to human life	Global warming			
	Grade 5	65-69	Human impacts on environment	The activities from socio-economic development has impacted environment in different ways, including causing natural disasters such as floods and typhoons.	Generating solutions for mitigation/prevention of the impacts of disaster or solutions to difficult problems in time of disaster or		
				The way how people mitigate and reduce disaster risks			
Ethics	Grade 4	11	Maintain the public construction	Understand the role of public construction, especially in time of disaster such as flood and typhoon	Study on how to be sympathy, tolerance, and help each other in disasters	Study the location of important places such as evacuation, hospital, police, etc.	
		12	Actively participate in humanitarian activities	When flood occurs, it is important to help each other during and after the flood		Study about the humanitarian activities available in the local community and actively participate	
		13	Understanding about NGOs	The role of NGOs including support for DRR		Study about the NGOs working in the local areas and their roles in local DRR	
		14	Environmental protection	Environmental protection and its link to natural disasters mitigation		Study about the local knowledge applying for activities on environmental protections as well as disaster mitigation/prevention	
	Grade 5	2	Responsible for your work	Own responsibility and what should be do in case of disaster	Self-awareness can help to empower students in risk situations and can help students have positive attitudes to manage risks.		
		8	Cooperation with people	Cooperation with local people and know how to call for help in the emergency situation	Study how to cope with disaster in cooperation with community	Study to cope with disaster in cooperation with local community	

		10	Local People's Committee	Understand about the Local People's Committee		Study about the role of local People's Committee in managing disaster issues	
		13	Understanding about UN	The role of UN bodies including support for DRR		Study about the activities of UN organization in the local areas and their contribution to the DRR activities	
		14	Protection of natural resources	The role of natural resources and effective use of natural resources		Study about the activities of local people that have impacts on the natural resources and causes natural disasters such as flood, erosions, etc.	
Geography	Grade 4	3	Production activities of the people in the Hoang Lien Son	Cause of flash flood (deforestation)		This part is "Dia ly dia phuong" (local geography), its contents focus on explaining the local natural and socio-economic conditions. This gives a lot of space for the integration of local knowledge on DRR. Depending on the location of schools, the teacher can choose the appropriate lessons as address to integrate knowledge on DRR, for example, schools in Hue will may choose the lesson 26 "Hue City" to teach about DRR in the local education, or in case of Da Nang City, the lesson 28 "Da Nang City" can be the best fit.	Drawing competition Story show Essay contest Hazard mapping
				Role of ladder field in mitigate impacts of flash flood			Drawing competition Story show Essay contest Hazard mapping
		4	The Northern Midlands	The impacts of deforestation and slash and burn and the cause of floods			Drawing competition Story show Essay contest Hazard mapping
				Planting tree will help to mitigate the impact of floods			Drawing competition Story show Essay contest Hazard mapping
		5	Highlands	Flood in highlands			Drawing competition Story show Essay contest Hazard mapping
		11	Northern plain	Mitigation measure of flood using dam system			Drawing competition Story show Essay contest Hazard mapping
		15	Hanoi Capital	Floods occur more frequent in Hanoi			Drawing competition Story show Essay contest Hazard mapping
		16	Hai Phong City	Typhoon and its impacts in coastal cities			Drawing competition Story show Essay contest Hazard mapping
		17	Southern plain	Flood and cause of flood in low-land areas			Drawing competition Story show Essay contest Hazard mapping
		22	Can Tho City	Living with flood			Drawing competition Story show Essay contest Hazard mapping

		24	Central coastal plain	Impact of flood and typhoon			Drawing competition Story show Essay contest Hazard mapping
		27	Hue City	Impacts of flood and typhoon			Drawing competition Story show Essay contest Hazard mapping
		28	Da Nang City	Impacts of flood and typhoon			Drawing competition Story show Essay contest Hazard mapping
		29	Sea, Island and Islands	Impacts of tropical storms, typhoons and sea level rise			Drawing competition Story show Essay contest Hazard mapping
	Grade 5	3	Impacts of climate	Causes and impacts of flood, typhoon and drought			Drawing competition Story show Essay contest Hazard mapping
		4	Rivers	Cause of river flooding			Drawing competition Story show Essay contest Hazard mapping
		5	Coastal areas	Impacts of typhoon in the coastal areas			Drawing competition Story show Essay contest Hazard mapping
		6	Land and forest	Typhoon, flood and sand intrusion. Role of forest, especially mangrove forest in mitigating damages from typhoon and flood			Drawing competition Story show Essay contest Hazard mapping
Arts						Draw pictures of disasters and how local people cope with disasters	Drawing competition